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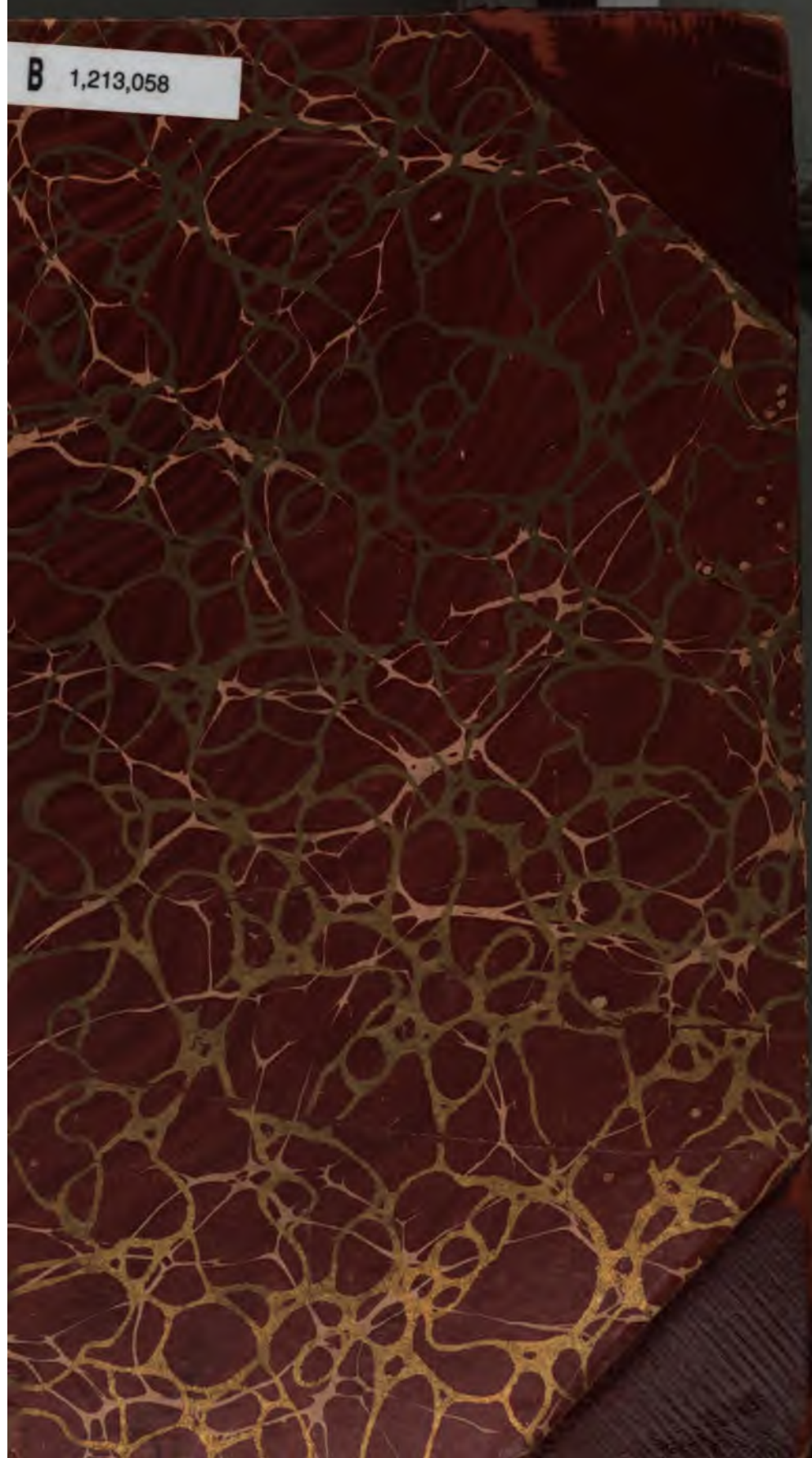
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R. T. FARNS















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PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL.

EDITED BY

THE HONORARY SECRETARIES.



JANUARY TO DECEMBER,  
1874.



CALCUTTA :  
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PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR JANUARY, 1874.

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The Monthly General Meeting of the Society was held on Wednesday, the 7th instant, at 9 o'clock P. M.

Col. H. Hyde, R. E., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentation was laid on the table :

From E. C. Atkinson, Esq., a List of Kumaon Plants by Dr. Watson.

The Secretary read a memorandum from Mr. Atkinson asking any member interested in the subject to add to or correct the list for the final list to be incorporated with the Kumaon Memoir.

The following gentlemen duly proposed and seconded at the last meeting were balloted for and elected ordinary members—

C. F. Magrath, Esq., C. S.

J. L. Peppé, Esq.

C. Heintze, Esq.

The following gentleman is a candidate for ballot at the next meeting—

Dr. C. J. Jackson, Sanitary Commissioner with the Government of Bengal, proposed by Captain J. Waterhouse, seconded by Dr. T. R. Lewis.

The following have intimated their desire to withdraw from the Society—

W. Eddowes, Esq., M. D.

G. E. Ward, Esq., C. S.

C. Brownfield, Esq.

Col. F. H. Rundall, R. E.

Mr. H. B. Medlicott exhibited five specimens of the Khairpūr Meteorite of the 23rd September, 1873, and read a description by the Rev. M. Yeates.

The Council reported that they propose Mr. Jules Schomburgh as an Associate Member of the Society on the grounds of his knowledge of Indian Architecture and his scientific skill in illustrating Indian Palæontology.



2                      *Correction of Engraved plates by Electro-deposition.*                      [JAN.

The President announced that the lectures to be given during the month of January, would be—

On the 14th, by the Hon. J. B. Phear—"On Glimpses of Old India as seen through the pages of Manu."

On the 28th, by Mr. H. F. Blanford—"On the Winds of Northern India."

The following papers were read :—

1. *On a Secondary Sexual Character in Squilla raphidea*, Fabr.—By J. WOOD-MASON Esq.

This note will be included in a paper on Indian *squillidæ*.

2. *On the application of Electro-deposition to the Correction of Engraved Copper plates.*—By CAPT. J. WATERHOUSE, Assistant Surveyor General.

Those acquainted with the practical details of the production of copies of maps, plans or drawings by lithography or engraving, are only too well aware of the necessity for making alterations on the stones or plates, either for the correction of mistakes and carrying out changes made during the progress of the work, or for the insertion of additional details in successive editions after it is completed.

In engraving or lithographing copies from pictures or drawings, corrections are seldom necessary if the engraver or lithographer possesses the necessary skill, and has been furnished with a properly finished drawing to copy from ; but in the case of geographical maps, the constant changes of boundaries, and the opening of railways, canals, roads and other administrative improvements, necessitate continual alterations of the plates in order that they may be correct and complete at the time of their publication. It is always undesirable to make these corrections on a finished map, but when necessary they may be made without difficulty on a stone or zinc plate, because the drawing is only on the surface and can be easily removed ; on an engraved copper-plate however, it is a different matter, because the lines forming the drawing are cut deep into the metal and must be erased entirely before any alteration can be made, leaving a hollow which has to be filled up again in order that the even surface of the plate may be restored and made fit for the new work to be re-engraved.

The usual way of doing this is by what is technically called "*knocking up*," i. e., carefully hammering the plate from behind on a polished steel anvil till the hollows are filled up, and the surface of the corrected parts of the plate perfectly even with the rest.

This method is simple but has two great defects—

1st. However neatly and carefully the knocking up may be performed,



it damages the engraving in the parts surrounding those erased, sometimes to a wide extent, and thus necessitates considerable labour and loss of time in retouching and restoring the damaged work.

2nd. The hollows formed at the back of the plate by the hammering, render the plate of an unequal thickness, causing difficulty in the re-engraving, springiness in the printing, and greatly increasing the wear of the plates in the vicinity of the corrected parts.

In the English Ordnance Survey Office and other institutions where special appliances exist for reproducing electrotpe copies of the engraved plates, this injurious method of 'knocking up' is in some cases superseded by scraping off the faulty details from the intermediate *relief* copy of the original plate and then obtaining from it a fresh electrotpe plate on which the parts that have been removed are represented by a smooth face of copper. This system is entirely free from any injurious effect on the original plate but is tedious and expensive.

So long ago as July 1856 Marshal Vaillant brought to the notice of the French Academy of Sciences an ingenious method invented by M. George, an engraver in the Topographical Bureau of the *Depôt de la Guerre*, who proposed to avoid the defects of both the above systems by the electro-deposition of copper in the hollows formed by the erasure of the names, lines or other detail to be corrected. Alterations can thus be effected without the risk of damage to work already done on the plate; the uniform thickness of the plate is preserved; the time required for carrying out the corrections is little more, and in some cases less than would be occupied in knocking up; while this method is always quicker and more economical than the plan of scraping details from the relief plate and then re-electrotyping.

This valuable process is largely used at the *Depôt de la Guerre*, Paris, but so far as I could ascertain, it is but little known in England, and though I have visited some of the principal geographical establishments in Europe, the only other institution in which I saw or heard of anything of the kind was in the Military Geographical Institute at Vienna. ♦

As the method I have adopted is in a measure, a combination of the Paris and Vienna systems, it will be advisable to give a brief description of both.\*

In M. George's method the engraved plate is first of all covered with a thin transparent bituminous varnish or etching ground. The parts to be corrected having been carefully and cleanly cut out, the cuts are surrounded for about half an inch, with a thick coating of Brunswick black, and the remainder of the plate all but one corner is thickly coated with wax. A trough

\* Full details will be found in my "Report on the "Cartographic Applications of Photography" of which there is a copy in the Society's Library.



about  $1\frac{1}{2}$  inch deep and corresponding in size to the extent of the required corrections is made on the plate by means of a strip of bordering wax and the plate is placed in a level position upon wooden blocks. The trough having been filled with a solution of sulphate of copper, one or more small cylindrical porous cells about 2" high and 1" in diameter are placed in position a few inches from the cuts; their number varying according to the extent of the corrections. A rod of zinc to which is attached a copper band, is placed in each cell, the free end of this copper band being attached to the uncoated part of the plate outside the trough, the circuit is completed by pouring a little very dilute sulphuric acid into the porous cell. The deposition of copper in the cuts then commences and in the course of 24 to 48 hours entirely fills them up and forms a ridge of copper all round them. The solution is then poured away, the wax wall and coating are removed and the surface of the plate having been protected by fastening strips of waxed paper round the corrected parts, the superfluous deposit is carefully filed down till it is no thicker than the surrounding paper and the remainder is removed with a sharp engraver's scraper. If this operation is skilfully performed, the surface of the corrected parts should be left perfectly even with the remainder of the plate and without a trace of damage to any of the surrounding work.

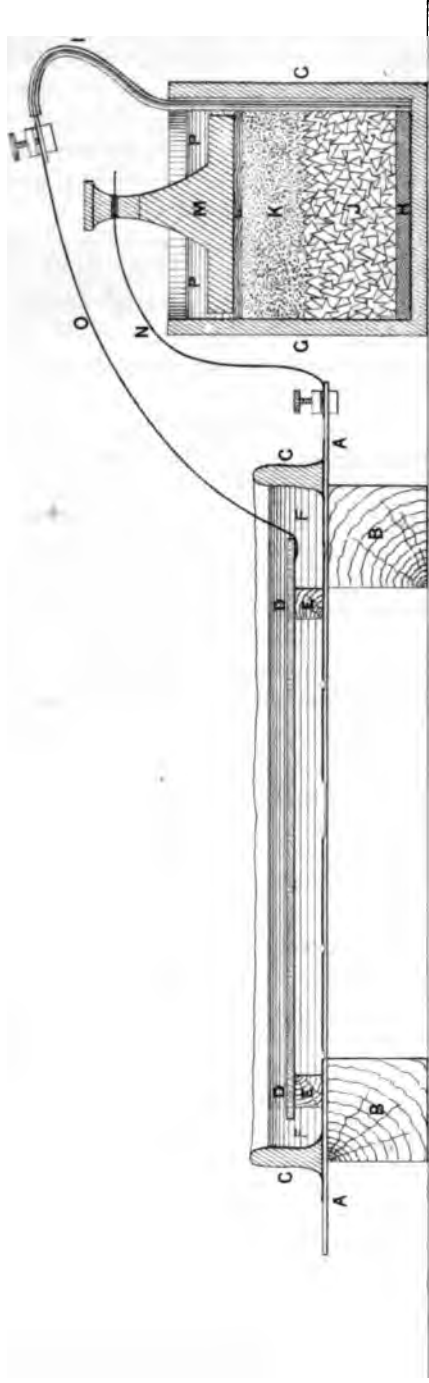
The method used at the Military Geographical Institute in Vienna differs considerably from the above but is equally effective. The engraved plate is first of all silvered by rubbing over it a solution of nitrate of silver in cyanide of potassium with a little tripoli powder. The parts to be corrected are then cut out and the plate placed in the depositing trough of the electrolyting apparatus ordinarily used at the Institute.

After the lapse of a few days a sheet of copper is deposited over the whole of the plate, and when the deposit is of sufficient thickness to fill up the cuts, the plate is removed from the trough. The deposited metal immediately above and around the parts to be corrected is then scraped down with a curved scraper till it is quite thin, when the covering sheet of copper is stripped off the engraved plate, leaving a slightly raised ridge over the corrections, which is removed with the scraper as in M. George's process.

This method is neither so simple nor so economical as M. George's, and the only advantages it would appear to possess are uniformity and regularity of action, as well as the perfect protection afforded by the deposited sheet of copper to the engraved plate during the removal of the superfluous metal.

In India, the rapid extension of railways, roads and canals, the frequent revisions of boundaries and the conflicting systems of orthography necessitate constant changes during the progress of the engraving of the Sheets of the Indian Atlas, and the necessity for adopting some such plan for making these corrections became apparent a short time ago, when happening to pass





Scale One-Fourth.

REFERENCES.

- |   |  |
|---|--|
| A A. Engraved Plate                     | I. Insulated wire attached to Disc of Copper         |
| B B. Wooden blocks supporting the Plate | J. Crystals of Sulphate of Copper (about 1 lb.)      |
| C C. Wax wall                           | K. Saw-dust  |
| D D. Copper Anode                       | L. Felt  |
| E E. Blocks supporting do.              | M. Disc of Zinc with Brass Binding-screw.            |
| F F. Solution of Sulphate of Copper.    | N. Copper band from do., attached to Engraved Plate. |
| G G. Stone Jar of Battery               | O. Copper band from Copper, attached to Anode        |
| H H. Union of Conner                    | P. Water.  |







through the engraving rooms of the Surveyor General's Office I observed that a plate on which numerous corrections had been made by the ordinary process of "knocking up" was consequently much disfigured by hollows and inequalities all over it, and finding that there was a very valuable plate of hill work, on which a boundary had to be altered, I proposed to try whether this could be done by the system I had seen working in Paris, and thus avoid the almost irretrievable damage the plate must otherwise have sustained.

At first M. George's method was tried, but not knowing the exact proportions of his solutions, nor being able to procure the same kind of porous cells, the early attempts did not succeed very well, and as there appeared to be other difficulties connected with working the single cell system, it occurred to me that the use of a separate battery might give better and more certain results. After a few trials, perfect success was attained by the following method which is scarcely less simple than M. George's, and much more economical than that practised in Vienna, while securing some of its peculiar advantages.

The engraved plate is prepared almost precisely in the same manner as in M. George's method, *i. e.*, it is first covered with a thin asphaltum varnish, the parts to be corrected are carefully cut out and the remainder of the plate, with the exception of one corner, coated with Brunswick black,\* a double coat being given on the part of the plate surrounding the cut to the distance of about 4 or 5 inches. When this coating is thoroughly dry, a strip of bordering wax is securely fastened down on the plate at a distance of about 2 or 3 inches all round the parts to be filled in, forming a water-tight trough about  $1\frac{1}{2}$  inch deep. (See Plate I.).

The battery is of the pattern in ordinary use in the Indian Government Telegraph Department known as Menotti's modification of Daniell's battery. It consists of a stoneware jar containing at the bottom a disc of lead or copper to which an insulated copper wire running up the side of the jar is attached. Above the disc of lead is a layer of crystals of sulphate of copper, then some saw-dust covered by a piece of felt over which is placed a thick disc of zinc with a brass binding-screw attached. To set the battery in action, the jar has only to be filled with water, and thus all messing with acids and disagreeable fumes are avoided. The bare corner of the plate and all the connections of the battery having been carefully cleaned, the zinc pole is attached by means of a narrow copper band to the clean corner of the engraved plate. A solution of—

Sulphate of copper,	5 parts
Sulphuric acid,	1 „
Water,	30 „

\* The object of coating the whole plate with Brunswick black is to preserve the surface from injury in case of leakage from the wax trough.



is poured into the trough and any air bubbles that may appear in the cuts are gently removed with a clean camel-hair brush. A piece of clean sheet-copper, large enough to entirely cover the parts to be filled in, and attached to the copper pole of the battery by a copper band previously soldered to it, is laid down above them at a distance of about half an inch, being supported in position by wax pellets or pieces of wood fastened to the plate with a little wax. The circuit being thus completed, the deposition of copper in the cuts commences and fills them up completely in the course of 18 to 24 hours. To ascertain whether the deposit is sufficient, a little instrument like a fork with three prongs of equal length, is used; the centre prong being placed in the cuts the other prongs should be quite clear of the plate on both sides. When the deposit is sufficiently thick, the battery is disconnected, the copper solution poured back into its bottle, the wax wall removed, the Brunswick black cleaned off with turpentine, and the superfluous deposit is removed exactly as in M. George's system by filing it down with a bent flat file, the plate being protected meanwhile by a mask of stout paper fastened down with Brunswick black. After filing to within the thickness of the paper, the remaining deposit is carefully scraped off till the even surface of the plate is restored. As the success of the operations entirely depends on the perfect adherence of the deposited copper to the original plate, every precaution must be taken to avoid the presence in the cuts of the slightest trace of grease or other matter which might cause non-adherence. The cutting tools must be quite clean and the cuts should be made with clean square edges. The sooner the filling in is performed after the erasures have been made the better. When the cuts are a day or two old, and in all cases where any doubt as to the perfect cleanliness of their surface exists, M. George recommends that the metal should be slightly bitten by means of a Bunsen battery, but I have found that the acid solution of sulphate of copper effectually removes all tarnish and oxidation, if not too old.

My practical acquaintance with the subject of electro-metallurgy and the experience we have yet had in working the method are too limited to enable me to state positively the advantages of the system I have adopted over those practised in Europe, but it has already been applied with complete success in the correction of two very valuable plates, and seems likely to prove of great service when extensive corrections have to be made. It is quite as simple as M. George's method and appears to possess the advantage of securing a more regular deposit over an extensive surface of the plate, the only precaution necessary being, to proportion the size of the anode to the extent of the work to be performed, so that the whole of the erasures are covered by it. In this respect it appears equal to the Vienna method but is much more rapid and economical in operation, though it loses the advantage of the protection afforded to the engraved plate by the



deposited sheet of copper while the superfluous deposit is being reduced. The time occupied in performing the operation is not of much consequence, compared with the importance of keeping the plate undamaged, but in the trials already made, it was found that the time required was really less than would have been occupied by 'knocking up,' and afterwards having to restore damaged work, and as the operation can go on during the night very little working time need be lost. The expense is a mere trifle, and the manipulations are so simple, that any European or native engraver could easily learn them.

I cannot of course claim any originality in the process beyond the modifications made in the European methods, but as it does not appear to be practised in England, I venture to bring it to the notice of the Society especially on account of the valuable aid it is likely to render in the production of the engraved sheets of the Atlas of India now rapidly progressing under the personal superintendence of the Surveyor General, and the possibility of its useful application to other purposes in the arts.

Colonel Thuillier said he thought the subject Captain Waterhouse had brought before the meeting was one of much interest and importance; not only in a professional sense as regarded his own department, but also in the interests of the Society and scientific objects generally. Colonel Thuillier could vouch for the very great importance of this mode of dealing with valuable copper plates, and the improvement it afforded on the old system. Captain Waterhouse had worked it out in a very practical manner and he was therefore entitled to the thanks of the meeting for his useful and interesting paper.

3. *New Burmese Plants*, Part II.—By S. KURZ, Esq.

This paper is a continuation of the author's former paper and will be published in the Journal, Part II.

4. *Identification of certain tribes mentioned in the Purānas with those noticed in Col. E. T. Dalton's Ethnology of Bengal.*—By BA'BU RANGALA'L BANERJI, Deputy Magistrate, Cuttack.

Little has hitherto been done to identify the various aboriginal races casually noticed in ancient Sanskrit literature. The notes on the subject appended to Professor Wilson's translation of the *Vishnu Purāna*, valuable as they are, as embodying the opinions of a thorough scholar and a man of vast experience, are nevertheless brief, obscure and often unsatisfactory, particularly regarding those races whose representatives are now no longer extant, or are few, insignificant or widely scattered. Particular races, such as the Coles, the Bheels and the Khonds, have been described at greater length in many essays and reports; but in their cases attention has been confined to



what they now are, and nothing, or next to nothing, has been done to unravel their ancient history. The Nágas have been more fortunate; they have had a great number of historians, and a great deal has been already written about their antiquity; but even as regards them, much yet remains to be known of what and who they were. The little knowledge hitherto possessed by European scholars regarding the autochthones of India have been a serious impediment in the way of a successful study of this branch of Indian archæology. Few knew the names of the ancient races, and fewer still of the modern ones with whom they could compare them. This difficulty has, however, now been in a great measure removed. The publication of Col. Dalton's magnificent work on the Ethnology of Bengal has placed in the hands of the public a large mass of information on the subject of the most authentic kind, and the way to identification on the part of those who are familiar with Sanskrit literature, is clear. The learned author has not himself attempted much in the way of identifying the races he has described with those named in Sanskrit works, but his book affords valuable help in the prosecution of the task; and I have availed myself of it in compiling the following rough notes regarding the antiquity of some of the races noticed by him. My object is to bring together all the salient points regarding the different races from Sanskrit works, and to render them easily accessible to European scholars as helps towards further research.

#### No. 1.

The first race I have to notice are the Kirátas, otherwise called Kirátis and Kirántis.

Manu classifies the Kirátas under the head of Mlechchhas in Chapter X, where he reckons them along with the Pauṇḍras, Oḍras, Dravidas, Kámbojas, Yavanas, Paradas, Chinas and the Pahnavas.

All these tribes have been identified: the Pauṇḍras or Pauṇḍrakas were the people of Western Bengal. Professor Wilson enumerates the following districts of Bengal and Behar to have comprised the ancient Pundra, viz. :—Rájsháhi, Dinájpur, Rangpur, Nadiyá, Birbhum, Burdwan, Midnapur Jangal Maháls, Rámgarh, Páchete, Palamow and part of Chunar. The word Puṇḍra signifies sugarcane of a particular species, called Puñri Akh in Bengali, so that Puṇḍra evidently means the country of sugarcane. It may be remarked here, that the other name of Bengal, Gauḍa, is derived from *guda*, or molasses; Gauḍa consequently means the land of molasses. The two names of the country thus have a meaning almost analogous in purport. The quotation from Manu proves beyond a doubt that Bengal and Behar were reckoned as Mlechchha Des'a, or unholy land, in the days of the great Hindu lawgiver; and there was then no distinction of caste in those countries, for Bharata, the sage, defines Mlechchha Desa as the country where the four castes do not dwell.



वातुर्वर्षवयसानं यस्मिन् देसे न विद्यते ।

खेदेसः स विज्ञेय आर्यावर्तस्ततः परं ॥

The Odras are the Uriyās, not of course the Brahmins, Karans and other Aryan castes which have settled in Orissa, but an aboriginal tribe whose representatives are found in the Or Chasas of that province.

The Draviḍas are identified with "the people of the Coromandel Coast from Madras southwards, those by whom the Tamil language is spoken," they are in fact still called Draviḍas by all orthodox Hindus.

Wilford regards the Kámbojas as the people of Arachosia. Arrian speaks of a country called Cambistholi; as the last two syllables of the word represent the Sanskrit, *sthala* (place), it evidently means the land of Kámboja, (vide note, Wilson's Vishṇu Purāṇa, page 182. Vol. 2). The Kámboja country was famous for its horses.

The term Yavana is now generally accepted as meaning the Greeks. The Prākṛita Yona is another form of Ion, by which name the Greeks were known throughout Western Asia—but a difference of opinion on the subject exists in some quarters.

The Sakas are the Sakai and Sacæ of classical writers, the Indo-Scythian of Ptolemy. They "extended about the commencement of the Christian Æra along the west of India from the Hindu Koh to the mouth of the Indus."

The Paradas were probably the Parthians—the Pahnavas, or Palhavas according to some readings, were people of the country lying between India and Persia, the modern word Pahlavi, the language of Afghanistan, retains a trace of Pahlava.

The Chinas were the people of China or Chinese Tartary according to some authorities.

The Daradas are the modern Durds—they are still living in the very same country where Manu found them: their country lies along the course of the Indus, above the Himalayas, just before it descends to India.

The Khasas are the Khásyas of North-East Bengal.

It is a noticeable fact, that these twelve tribes of Mlechchhas mentioned by Manu, all belong to the North of India and the North-West frontier, excepting the Odhra and the Dravidas; this shews that the aboriginal Kols, Bheels, Gonds, &c., were unknown or very little known in Manu's time: the last were reckoned more as giants and monsters (Rákshasas) than men.

But to return to the Kirátas. They have been noticed in Book II, Chapter III, of the Vishṇu Purāṇa, as a people living on the east of Bhárata or India, they were known to the Greeks as the Ceriadæ. These foresters and mountaineers are still living in the mountains east of Hindustan, and are still called Kirátis or Kirántis.

The bard of Sipurá, Kálidása, notices the Kirátas in his famous poem,



Kumára Sambhava or the Birth of the War-god, when describing the Lord of mountains, Himalaya.\*

Although the Kirátas were classed by our poets and sages among the *Mlechchhas* or barbarians, still it is clear that they were not hated or shunned by the Aryan conquerors, like the other aboriginal tribes of India. The great hero of the Mahábhárata, Arjuna, adopted the name, nationality, and guise of a Kiráta for a certain period, to learn archery, and the use of other arms from S'iva, who was considered as the deity of the Kirátas. This episode of the Mahábhárata was taken up by the poet Bhárávi, who describes it in detail in his celebrated poem Kirátárjuniya.

Again, both the Himalaya-born goddesses Umá and Gangá have the nicknames of Kiráti applied to them by our lexicographers; and it is a question therefore whether these goddesses were the daughters of some Kiráta chieftain of the Himalaya, married to S'iva, a Hindu divinity, affording an example of miscegenation among the two races effected at a very early period of History; or whether S'iva was himself a Mongolian. His residence in the far Kílása, his braided hair, his oblique eyes, his great proclivity for smoking, his reputed authorship of the Tantrika, nasal, monosyllabic Mantras, go far to prove him to be a Mongolian rather than of an Aryan type. I have shown that the modern Kiránti or Kirátis are the Kirátas of Ancient India; this can be also proved geographically and ethnologically—we find them occupying the same country as described in the Puráṇas, and their physical traits and manner of livelihood agree.

The Kirátas, though now turned into cultivators and eaters of rice, were flesh-eaters in Ancient India, like their brethren living on the other side of the Himalayas; in fact, their chief occupation was nothing else but the chase.

It is remarkable that the medicinal Chirretta is a corruption of Kiráta, which is the Sanskrit name for this drug. The only other synonyms in Sanskrit are *Bhunimba*, *Anáryya-tikta* and *Kandalitikta*, the first means that it is the *nim* or *azadirachta* of the earth; the second implies the bitter of the non-Aryans; and the third signifies that which contains bitter in its trunk. The second name is very suggestive. It is a well known fact that the Chirretta grows in the lower ranges of the Himalaya, the country of the modern Kirántis or Kirátis.

In the topographical lists of the Mahabharata, Bhishma Parva, separate

- \* भागीरथी निर्गरीकरोत्  
 बोधा मुञ्चः काम्यत देवदारः ।  
 यद्वायुरन्विहस्रजैः किरातै-  
 रासद्यते सिद्धिश्चिद्वर्धः ॥ Chapter I. Verse 15.



mention of the Kirátas occurs more than once ; this leads me to infer that the aborigines now known under that appellation must have separated themselves and formed different clans before the great epic was composed. The Rájmálá, which gives an analysis of the royal family of Tipperah, states that the ancient name of Tripurá was Kiráta. According to Major Fisher the people of Tripurá are of the same origin with the Kácháris, but Colonel Dalton places the Kácháris in the same group with the Kirántis—the latter are placed under the head of “ Northern borderers,” and the former under “ Population of the Assam valley.” The dispersion of a race of hunters like the Kirátas was natural, and it was helped to a large extent by the Aryan settlers pushing them on further and further as they spread, and that will account for the wide range they now occupy.

## No. 2.

Hayásyas, Haioos or Hayas. The horse-faced race.

Dr. Campbell gives a tradition that the Hayas originally “ came from Lanká, having left that country after the defeat of their king Rávana by Rámachandra ; but the Raksha king Rávana is still their hero and god, and they have no other. They say that they remained a long time in the Deccan, whence they journeyed on to Semrounhar, in the days of its glory, and that lastly, but a long time ago, reached the hills, their present abode.” Now the Kinnaras, or heavenly choristers, were described by the poets of India as living in the Himalaya under Kuvera, the Indian Plutus, and they were yeleft Hayásyas or horse-faced, an epithet which is well accounted for when we read the physical traits of the modern Haioos or Hyas in Hodgson. The tradition of their being the kinsmen of Rávana is explained by the fact that in the Ramayana, Kuvera, the lord of the Hyásyas, is styled the step-brother of Rávana. Again, the Hyásyas were designated Kinnaras, which means, men of ugly features. Mr. Hodgson’s description certifies the deformity of this people very plainly and pointedly, as will be seen in the following extract : “ The physiognomy of this tribe is rather of the Mongolian cast, the bridge of the nose is not perceptibly raised, the cheek bones are flattened and very high, the forehead narrow.” This description may be applied generally to all the offshoots of the Mongolian race inhabiting the sub-Himalayas. The profile and full face sketches given by Hodgson at page 78, Vol. XVII, Part 1 of the Journal of the Society, fully justify the Indo-Aryan writers in designating the race with the epithet *Turanga-vadanas* or horse-faced.

Mr. Hodgson defines the Kiránt country thus :—

- |                      |   |           |
|----------------------|---|-----------|
| 1. Sunkosi to Likhu. | } | Khombuan. |
| 2. Likhu to Arun.    |   |           |
| 3. Arun to Mechi.    | } | Limbuan.  |
| 4. Singilela ridge.  |   |           |



He observes that the Khombuan and the Limbuan are, at all events, closely allied races; and according to Dr. Campbell, in the generic term Limbu, are included the Kirántis, the Eakas (Hodgson Yukhas), *i. e.* Yakshas, and Kais. That the Kirátas and Yakshas herded together or occupied the same region of Himalayas in Ancient India may be gathered from the following extract from Kálidása :

जितसिंहभया नामा यवाक्षा विलयोनयः ।

यक्षाः किम्पुश्याः पौरा योषितो वनदेवताः ॥

The Kimpurushas were the Kinnaras, *i. e.* the Hayásyas, *i. e.* the modern Haicos. That they originally migrated from Mongolia may be deduced from the fact of Hindu geographers placing the Kimpurusha varsha, or the country of the Kimpurushas, between the Himalaya and Hemakuta or Altai mountains.\*

### No. 3.

Yakshas = Eakas or Yakhas.

These people are thus described in the Puráṇas. “The Yakshas are the servants of Kuvera, moving in pairs, with storax and stones in their hands, dark as collyrium, their faces deformed, eyes a dull brown, their statures enormous: they are dressed in crimson robes and crystal beads. Some of them are of high shoulder-bones.” This description, however, is totally contradicted by Kalidása, who describes the wife of his exiled Yaksha, in the following glowing lines :

“There, in the fane, a beauteous creature stands,  
The first best work of the Creator's hand ;  
Whose slender limbs inadequately bear  
A full-orbed bosom, and a weight of care ;  
Whose teeth like pearls, whose lips like Bimbas show,  
And fawn-like eyes still tremble as they glow.”

(*Wilson's translation*).

The contradiction, however, may be easily accounted for when we call to mind the difference between the matter-of-fact description of the Puráṇas with that of the great poet of Ujjayini, replete with elevated fancy and imagination. The Puráṇic description agrees best with modern ethnology.

The ancients knew well that the country of the Yakshas was the land of the pine and turpentine. The Sanskrit for *Pinus longifolia* and turpentine is *Yaksha Dhupa*, or incense of the Yakshas. This “is a native of the Himalayas, at elevations of 5 to 600 feet, and also found in the Kherree Pass, the entrance to Nepál. The wood is light, and being full of resinous matter, like the *Pinus Deodara*, both are frequently employed in the hills for making torches, as pieces of other species often are in other parts of the world. A

\* अमूदीपस्य नववृक्षानामर्तं हिमाचलस्यैव कुटयोर्ध्वनिर्वर्ध ।



very fine turpentine is obtained as an exudation from incisions made on the trunk." The tree is sometimes called *Sarala*, or straight, on account, no doubt, of its erect shape. It is thus noticed by Kalidāsa :

"Hark ! the gales whistling through the woods of pine,  
 Urging to madness all the straining boughs  
 That twist and chafe and bend and intertwine,  
 The latent flame to wildest fury rouse,  
 Singeing the long hair of the mountain cows.  
 Quick ! rain a thousand torrents on the crest  
 Of the kind hill and cool his burning brows :  
 With wealth of water thou art richly blest,  
 And fortune's sweetest fruit is aiding friends distrest.

V. 55. *Griffith's translation of the Meghaduta.*

A very aromatic unguent was said to have been much used by the ancient Yakshas called *Yaksha Kardama* or Cerate of the Yakshas, composed of camphor, agallocham, musk and kakkola (*Myrica sapida* ?) All these ingredients, excepting agallocham, are productions of the sub-Himalayan range. In the *Meghaduta*, the following verses shew that the Yakshas were in the habit of burning incense or aromatic powders in their bedrooms.

"Here filled with modest fears, the Yaksha's bride  
 Her charms from passion's eagerness would hide ;  
 The bold presumption of her lover's hands  
 To cast aside the loosened vest, withstands ;  
 And, feeble to resist, bewildered, turns  
 Where the rich lamp with lofty radiance burns ;  
 And vainly whelms it with a fragrant cloud  
 Of *scented dust*, in hope the light to shroud."

*Wilson's translation of the Meghaduta.*

The following extract again shews that the Yakshas must have been great experts in architecture and the art of painting :—

"And she\* has charms which thought but there extols ;  
 High as thyself her airy turrets soar,  
 And from her gilded palaces there swells  
 The voice of drums, loud as thy thunder's roar ; \*  
 Thy pearls are mockt by many a jewelled floor,  
 Come, with the glories of thy bow compare  
 The varied tints on arch and corridor :  
 And, for thy lightning in the midnight air,  
 Look in her maiden's eyes and own a rival there."

*Griffith's translation of the Meghaduta.*

\* Alaka, the city of the Yakshas.



We have no description of the houses of the modern Yakshas, but we have that of the houses of a cognate tribe, the Bhutias, which shews that “in the construction of their houses, they are rather in advance of their neighbours of the plains. They are compared to small farm-houses in England and to Swiss cottages, built generally of rubble-stone and clay of two, three, and sometimes of four stories: all the floors are neatly boarded with deal, and on two sides are well constructed verandas ornamented with carved and painted woodwork. One of these is sometimes enclosed for the women, the front opening by sliding panels when they wish to peep. The workmanship displays considerable skill in joining, the panelling being very good of its kind.” The description in Sanskrit quoted above was that of a Prāsāda, a temple according to the commentator. Compare the above description with that of a modern temple visited by the writer in 1849:—

“It is a square building with gable ends and a thatched projecting roof under the gable, facing the north; there is a projecting balcony in front of a large bay window which lights a recess at the opposite end of the temple containing three large Buddhist images, all seated in the usual cross-legged attitude of absorbed contemplation. They appeared to be formed of clay, and were exceedingly well executed and resplendent with gilding. The apartment, about 20 feet square, is boarded, and the walls are entirely covered with painting, of figures in similar penitential attitudes but differently dressed. \* \* \* \* \* The colours were particularly brilliant and well chosen, and the drawing tolerably correct to heighten the effect. A priest’s house also of stone and two-storied, was near the temple; and with its projecting roof and balconies was a picturesque effect.”

#### No. 4.

Bhillas=Bhils or Bheels.

The following is a description of a Bhilli or Bheel woman from the *Hyagriva-vadha Kāvya*.

“The Bhilla damsel, clad in leaves girt with a creeper, was reclining on the brow of a hill, whilst her husband was engaged in decorating her locks with hill-jessamines, culled by herself.”\*

This description puts one in mind of the Patuá or Juángá women so graphically described and illustrated by Col. Dalton. Very likely the Bhil women had not given up the verdant foliage for their dress, when the *Hyagriva-vadha* was composed; but a hypothesis may be started as to the origin of the Bhillas of Rajpútána and the Juángás of Keonjhar. It is a puzzle to ethnologists whether the Bhils and the Kols do not belong to the same aboriginal stock. Mr. Forbes Ashburner,

\* अघनस्यलनखपवचक्षिमिरिमक्षिकुहुमानि कापि भिक्षो ।

अवचित्य निरो पुरो निषया स्वकचानुत्तुचयाचकार भर्ता ॥



the Rev. Mr. Dunlop Moore, Sir John Malcolm, Captain Probyn and other authorities are of opinion that the Kols or Kolis and the Bhils are not distinct races, and we know that the Juángis or Janguás are a subdivision of the Kolarian race, the conjecture therefore follows that the Kolarian race with all its branches was known to the Puránic writers under the generic name of Bhillas, for we have hitherto failed to find in the Purápas and the poetic literature of the middle ages any description or details of the Kols distinct from those of the Bhils. The Bramha Vaivarta Purápa ascribes the origin of the Kols to a Tivara mother. Parasara and others say that the Bhillas were born of a Tivara father and a Bhráhmāni mother.\*

The Bhils speak a sort of Hindi throughout their haunts in Rajpútāna, and they are much more Hinduized in their habits and customs than most of the other aboriginal tribes of Southern India. Indeed, the elder Hindu writers classed them among the *Antyajās* or lowest castes of the Hindus. It has been already noticed that the great Parásara, the father of the still greater Vyása, ascribes their origin to a Bráhmāni mother and Tivara father; the Tivara is the modern Tiar of Northern India and Bengal, and the Tivaras according to the same authority were the offspring of a Churnaka woman by a Pundraka, both very low castes, the Churnakárs are the Chunarís or makers of Chunam; and these facts show that the Bhillas were considered from a very early period to be a cross between an Aryan and an aboriginal tribe. Later writers, particularly lexicographers, it is true, classed them among the mlechchhas, but neither Manu nor the other lawgivers have done so. Parásara appears to be a great tolerator of all the hated tribes, and this may be accounted for by the fact, that he himself begot Vyása by a Kaivarta woman called Matsyagandhá or she of fishy-smell. Her son, Vyása, of course, gives her a Kshatriya origin by a most unnatural myth, though he admits her to be the nursling of Dosa, the Kaivarta chief. Now these Kaivartas have been classed along with the Bhils in one of the law books of the Hindus.† So we have not only the Kaivartas but the Rajakas (washermen) and the Charnakárs (leather dressers) in this category. The Charnakárs are scarcely considered as Hindus. Sir George Campbell, speaking of them in his *Ethnology of India* says "They used to be sworn in a Court by a peculiar guru of their own, not by the ordinary name

\* पुलिन्द मेद भिजास पुत्रो मज्जस चावकः ।

कुन्दकारो डोखलो वा खतपो वसिपस्तया ॥

रते वै तीवराज्ञाताः कन्यायां ब्राह्मणस्य च ।

† राजकचर्मकारस्य गटो वरुड एव च ।

कैवर्त मेद भिजास सप्तैते खन्धजाः स्मृताः ॥

इति प्राचयिमतत्त्वम् ।



of God." But though the Chámárs are hated as outcastes and helots to this day, their congeners, the Kaivartas and Rajakas, are not—at least in Bengal. The late millionaire lady Rásmaní Dási of Janbazar was a Kaivarta, and the first man of Calcutta, who interpreted the English merchants to the weavers of Sataloti, was a Rajaka, or washerman; his name was Káli or Kalan Sarkár, and one of the streets in the native part of the town still bears his name: he is said to have been the foremost native of influence in Calcutta during his time. The Kaivartas, the Rajakas, and the Chámárs have much improved in physique and complexion; in fact some of them are as fair as the fairest of Bráhmans, owing to their constant contact with the Indo-Aryans, but their old brother Bhilla still retains the same Ethiopian colour and diminutive stature which characterised him when Parásara found him in his jungle home thousands of years ago.

The modern Bhils do not appear to be so exclusive as other branches of the great Kolarian race. Sir George Campbell says: "It seems very strange that they should have no language of their own;" and we are given to understand by Col. Tod that the Oondru Bhil "still claim the privilege of performing the *teeka* on the inauguration of the descendants of Bappa," and that the Bhumia Bhil chief of Oguna Panora "is of mixed blood, from the Solanki Rajput, on the old stock of pure (Oogla) Bhils." It is a curious fact, that the autochthones of India preside prominently in the coronation of their Aryan conquerors to this day, in many places. The interesting scene witnessed by Colonel Dalton in Kaunjhar on the occasion of the late inauguration of young Dhananjaya Bhanga, is an instance of this misdirected loyalty; but this interchange of good offices and blending of two different races are the natural consequence of the promiscuous association we have had in India from the days when Ráma conquered Ceylon with his aboriginal cohorts to the days when Seringapatam and Assaye were surrendered.

In the later poems of the Hindus, we find that in the Sayambara or the ceremony of proud daughters of the solar and lunar royal races in the choosing of their husbands, even the outcaste Bhilla and other aboriginal chieftains were invited, and sat side by side with the flowers of Kshatriya chivalry and heroism.

In concluding this paper, I may notice *en passant* a curious mistake committed by Col. Tod where he translated "Vena Putra" as children of the forest. Vena Putra means the children of Vena, the notorious infidel king, in whose time intermarriages of the original four great castes were allowed, whence originated all the Antyajás who represent the lower orders of the Hindu community.



Mr. Phear said if the identifications were well founded, as to which an opinion could hardly be formed upon the short extract from the paper which had been read, they would be valuable contributions to ancient Hindu history. The interest, and at the same time the difficulty of questions such as those dealt with by the paper, might be illustrated by some curious facts. Col. Dalton in his *Ethnology of Bengal* remarks, that the dances of the Sántal girls of the present day almost precisely correspond with the description given in the *Vishnu Purána* of the dances of the cow-girls in which Krishna formed the centre point, and he, Mr. Phear, would say from his own observation, that he thought it impossible for any one who witnessed the joyous light-hearted dances of the young people both Oráons and Kols on the Chutiá Nágpúr plateau not to be at once struck with their resemblance to the scenes of the Puranic traditions. And thus we seemed to have arrived at the noteworthy fact, that marked peculiarities of social manners and habits, which the Puránas depict as obtaining among supposed Aryans of the purest water, are now to be observed among non-Aryans; and it may be added are to be observed there exclusively, for it is hardly too much to say that the hilarious enjoyment of life, and the vivacious dances still to be seen on the outside of the Hindu populations, have become at this time, whatever was the case in the days of antiquity, foreign to the Hindus. It is also remarkable that perhaps the best illustration, which could be given of the system of internal state administration among the ancient Aryans, so far as it is disclosed to us by *Manu*, would be drawn from the actual administrative organization of the Kol, *i. e.* non-Aryan, community as it existed down to very recent times.

5. *Description of a Bachelor's Hall among the Mikir Tribes, Assam, with certain Symbols connected therewith.*—By C. BROWNLOW, Esq., Kachhár.

At a point on the Gúmrah river where it makes its exit from the north Kachhár range, or rather just where it leaves the higher ridges and comes out among low outlying hillocks on which stands the tea plantation of Kallinecherra, at this point and nearly opposite the Kallinecherra garden, is one of those old fortifications that occur at points all along the range.

It consists of an earthwork thrown up along the south face of the hill, and all along the top of the mound there are traces of ancient masonry-work now fallen to pieces or removed.

The bricks are large and squarish, not very thick, and well burnt.

On the mound stands an immense *Artocarpus* (Cham) tree, which must have taken root after the mound was formed and which is certainly not less and probably much more, than a hundred years old. The west side of the fortification is a steep natural scarp descending sheer down to the river, and on the east side is a ravine almost equally steep. The position is



admirably selected, and might, with a little repair, and a few additions, be made almost impregnable.

The interior of the entrenchment is at present occupied by a Mikir village consisting of 8 or 10 houses which are built on piles at a good height above the ground, each house having a bit of open platform in front on which the people sit in the evenings and sleep at nights. There is no palaver house as in Kachhári villages.

The Bachelors' Hall which it is the immediate object of this paper to describe, is situate on one side of the village, a little apart; it is well built and stands on piles like the the rest, and is matted with the wild bamboo turza, or matting made of the bamboo beaten at the joints until well split and then opened out, this is the matting used in all habitations of hill-men that are anywhere near the jungle and that are built on piles.

There is a front stage to the Hall which is reached by a wooden ladder consisting of a log with recesses cut for the foot.

On both sides of the stage there are live *símúl* trees (*Bombax heptaphyllum*) which have been put in live and have rooted, and on one of them was affixed a plant of that elegant parasite, the *Dendrobium bambusifolium*. At the entrance there are also several entire bamboos arranged, so as to allow any or all to be lifted up for anybody to pass and then let down again. At the opposite side of the house inside was the urinary, consisting of a small recess projecting a little way out from the building.

Of the figures in the plate, No. 1 is a stick peculiarly carved, which is charred and used for cleaning the teeth. (See Plate II).

No. 2 is a drum used for summoning the lads and unmarried men to sleep.

No. 3 is a bundle of sticks used in jhoom measurement.

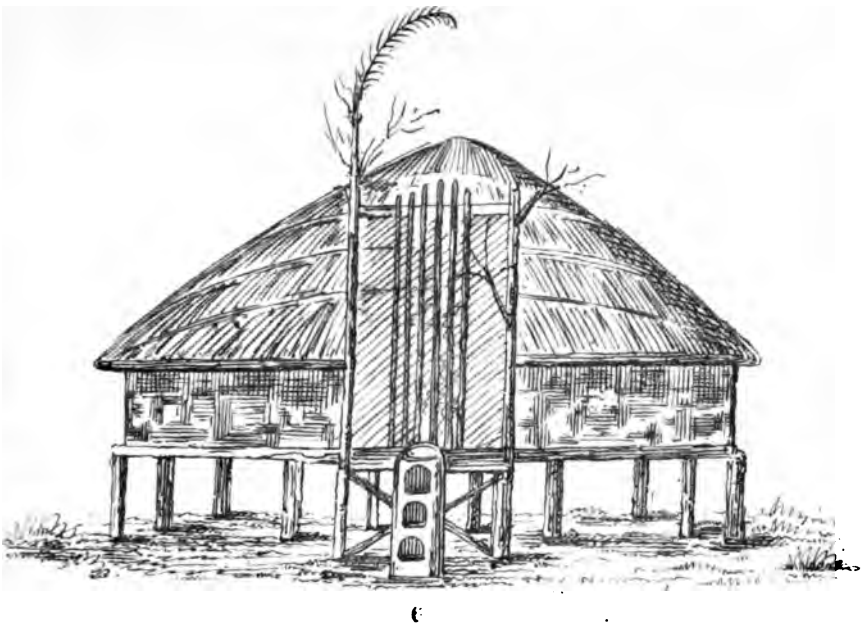
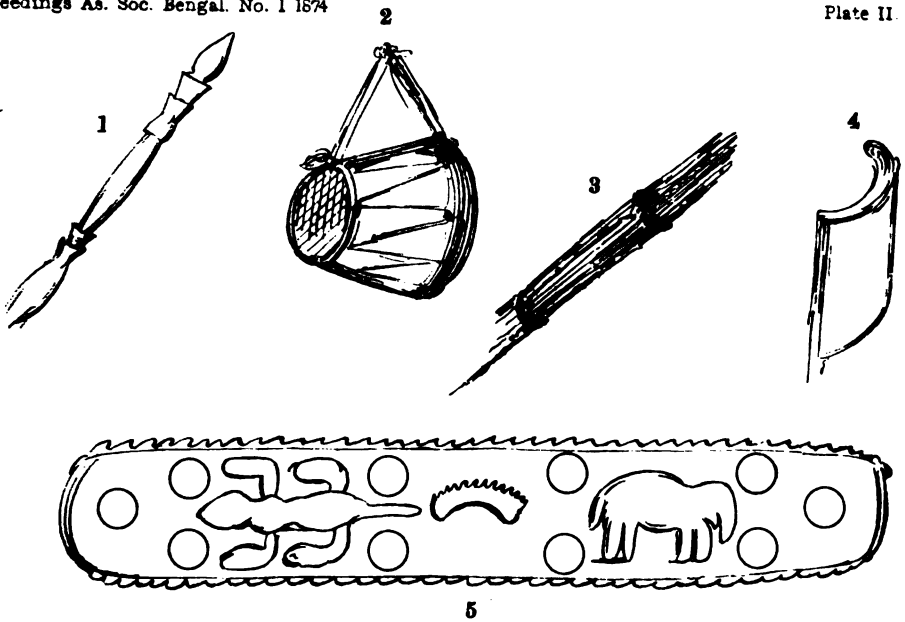
No. 5 is a board fixed over the door which has carved on it certain emblematical figures, which were explained to me as—woman's breasts, *Chehang* (an alligator?), *Ingnar* (elephant), *Chiklow* (moon). As these symbols may very possibly throw light on the affinities and origin of the tribe I think a notice of them may be of interest to your Society.

The Mikir numerals are as follows—

isi	heni	kathom	phelee	phongo	tharok	throksi	nerkep	serkep
1	2	3	4	5	6	7	8	9
kep	kray	so	kray	hni				
10	11		12					

Mr. Phear observed that Mr. Wallace in his Malay Archipelago mentioned the institution of Bachelors' Halls among the Dyaks of Borneo; and he said that the same thing still existed in one or two Oráon villages in the neighbourhood of Ránci.





- 1 Stick for cleaning teeth, end charred.
- 2 Drum for summoning Young Men to the Hall.
- 3 Bundle of Sticks for Surveying Jhoom.
- 4 Urinary.
- 5 Board over door representing Chehang (Alligator?), Inguar (Elephant), Chiklow (Moon), and Woman's breasts.
- 6 Bachelor's Hall.







6. *Note on the (probable) identity of Fattapoer and Sjatterapoer in Van den Broucke's Map of Bengal (1660, A. D.) with Fathpúr and Játrápúr, respectively, on the Bhairab River, in the Jessore District.*—By H. J. RAINEY, Esq.

I observe in Mr. Blochmann's "Contributions to the Geography and History of Bengal" that he refers (p. 221) to a road from Bardwán, over Salímábád, Húglí, Jesar, Bosnah, Fathábád, across the river to Sjatterapoer, etc., and in a footnote it is stated,—“Rennell gives Satrapur; but modern maps give no such name.”

I regret I have not *here* a copy of Rennell's map to refer to, but on glancing over the southern portion of Van den Broucke's map (obtained by me from M. Cartamberd, Paris, and published by Mr. H. D. Sandeman, C. S., in "Selections" from Calcutta Gazette, Vol. IV, as "Map of the Soonderbunds in 1724"), I find Jessoor (Jessore) to be situate on the left bank of a river, and Fattapoer to the N. E. of it, on the right bank of a river, from whence across the river we have Sjatterapoer, on the confluence of a large river from the N. W. and a comparatively small stream from the N. E.

On comparing the above map with sheet 121 of the Indian Atlas of the Survey Department, there can be no doubt whatever, I think, that Jessoor given in the former, corresponds with Jessore-Iswaripúr, on the left bank of the Jabuná (Jamuná), which city flourished under the famous Rájá Pratá-páditya (immortalized by Bharat Chandra in his charming poem of *Bidya Sundar*), during the close of the sixteenth, and commencement of the seventeenth century; and the Dutch map was prepared in 1660, according to Mr. Blochmann, p. 242.

Sjatterapoer I have little hesitation in identifying with Játrápúr, on the right bank of the Bhairab River, a place of some consequence, where there is a considerable Bázár, a short distance from the Mausoleum, etc., of the local Muhammadan warrior and saint, Khán Jahán 'Alí. The Bhairab is *now* a narrow and shallow stream at Játrápúr, but the name of the river signifies "the dreadful;" hence it will not be wrong, I think, to infer that it was *then* a large river. I may add, that it is not unusual to find in the olden maps that the letter 'S' has been prefixed to the name of a place having 'J' for its initial letter, *e. g.* 'Sjanabath' for Jahánábád.

Fattapoer I take to be Fathpúr, a well-known village in my family zamíndári, appertaining to Parganah Hoglá, on the right bank of the Bhairab (not marked on the map), not far from the Sub-Division of Khulná, close to, and east of, the junction of the Athárabanká with the river before named. The position of Fathpúr, as here indicated, between Jessore-Iswaripúr, and Játrápúr is almost precisely the same as that occupied by Fattapoer, with Jessoor on one side, and Sjatterapoer on the



other ; and, the only apparent difficulty is as regards the wide stream between Fattapoer and Sjatterapoer, shown in Van den Broucke's map, while Fathpúr and Játrápúr are both on the same side of the river. But my knowledge of the locality, and acquaintance with its traditions, enable me to state positively, that the waters of some of the northern rivers of Jessore did not formerly meet opposite the sub-division of Khulná, and flow down the Rupsáhá\* (Roopsa), but some distance to the eastward, through the Jogíkháli and Gopí Nadi† (the former is fast silting up, and the latter is entirely closed) into the Pasar (Pussur). Besides, we have the dry bed of a river, called by the natives *Márá Gang*, or "dead river," which apparently ran between Fathpúr, and discharged itself into either the Gopí Nadi or Jogíkháli, and thus communicated with the Pasar.

From Van den Broucke's map, it would appear that the Ganges probably near the existing station of Kustiyá (Koosteah) divided into two branches ; one running in a south-westerly direction down the Jabuná under Jessor-Iswaripur, and the other in a south-easterly direction down the river under Játrápúr, the name of which river I cannot trace. That the Ganges has changed its course considerably, is generally known, and on this head the remarks of Dr. Oldham, an acknowledged authority on the subject, may be aptly quoted : "It is also certain in this peculiar delta, the general course of the main waters of the Ganges has gradually tracked from the west to the east, until of late years the larger body of the waters of the Ganges have united with those of the Brahmaputra and, have together proceeded to the sea as the Megná." *Vide Proc. As. Soc.*, Feb. 1870.

On the whole, I venture to think, that we may reasonably conclude the identity of Sjatterapoer with Játrápúr, and Fattapoer with Fathpúr, to be almost, if not quite, established. And if it be so, then Van den Broucke's map is utterly wrong in placing Noldy to the S. E. of those two, places, instead of in a diametrically opposite direction, *viz.* N. W., *provided* it was meant for "the town and mahall of Noldí (Naldí) on the Noboganga," as surmised by Mr. Blochmann, (p. 231.) At any rate, I confidently submit, Jessor is meant for Jessore-Iswaripur, and such being the case, Noldy would not exactly be to the south-east of Jessore, but to the north-east thereof.

The receipt of the following communication was announced—

1. Annals of 'Omán, translated from the Kashf-ul-Ghummah by Col. E. C. Ross, Political Agent at Muscat.

\* This was originally a mere *kádá*, or small creek, excavated by one Rúp Sáhá, a Salt Merchant (from whom it derives its name) towards the close of the last century, to connect the Bhairab and Pasar rivers, and thus facilitate the progress of boats laden with salt proceeding down to Calcutta. It is now a wide and turbulent river, but the ferry *ghát* at Khulná is still known as Rúp-Khálí-Ghát. H. J. R.

† Neither of these are shown in the Survey Map. H. J. R.



## LIBRARY.

The following additions have been made to the Library since the meeting held in December last.

*Presentations.*

\*.\* Names of Donors in Capitals.

Proceedings of the Royal Society, Vol. XXI, No. 146.

*G. W. Royston-Pigott*.—Researches in Circular Solar Spectra, applied to test Residuary Aberration in Microscopes and Telescopes.

The Quarterly Journal of the Geological Society, August, 1873.

*Mr. Schindler*.—On the Geology of Kazirun, Persia. *P. M. Duncan*.—On the genus *Palæocoryne* (Duncan and Jenkins) and its affinities.

## THE GEOLOGICAL SOCIETY OF LONDON.

Journal of the Statistical Society, Vol. XXXVI, Part II, Secs. 1 and 2. Part III.

Part II. Sec. 1. *E. B. Martin*.—Notes on the Purchase of the Railways by the State.

Part III. The Progress of Indian Finance.

## THE STATISTICAL SOCIETY OF LONDON.

Journal of the East Indian Association, Vol. VII, No. 2.

The Land Question in India.

## THE EAST INDIA ASSOCIATION, LONDON.

Journal Asiatique Nos. 4, 5, 1873.

No. 41. *M. F. Fagnan*.—Observations sur les Coudées du Mekyas. *M. Halévy*.—Etudes Sabéennes, examen critique et philologique des inscriptions sabéennes connues jusqu'à ce jour. *M. Belin*.—Bibliographie Ottomane, ou Notice des livres Turcs imprimés à Constantinople durant les années 1288 et 1589 de l'hégire. *M. Barbier de Meynard*.—Bibliotheca Geographorum Arabicorum.

## \* THE ASIATIC SOCIETY OF PARIS.

Bulletin de la Société de Géographie, Septembre, Octobre, 1873.

Septembre. *J. Halévy*.—Voyage au Nedjran. *Dr. Martin*.—Pékin : sa météorologie, son édilité, sa population.

Octobre. *C. Grad*.—Résultats scientifiques des explorations de l'Océan glacial à l'est de Spitzbergen ; en 1871.

## THE GEOGRAPHICAL SOCIETY OF PARIS.

Zeitschrift der Deutschen Morgenländischen Gesellschaft, Band XXVII, Heft III.

*H. von Maltzan*.—Dialectische Studien über das Mehri im Vergleich mit verwandten Mundarten. *Dr. O. Blau*.—Altarabische Sprachstudien. II. *Dr. H. F. Mögling*.—Jeimini Bhārata, 2 Kapitel, aus dem Kanaresischen umschrieben, übersetzt und erläutert. *E. Schrader*.—Die Abstammung der Chaldäer und die Ursitze der Semiten. *J. Grill*.—Über das Verhältniss der Indogermanischen und der Semitischen Sprachwurzeln.

## THE GERMAN ORIENTAL SOCIETY, LEIPZIG.

Monatsbericht der Königlich-Preussischen Akademie der Wissenschaften zu Berlin, Juni, Juli, August, 1873.



Juni. *Peters*—Über einige zu der Gattung *Cynonycteris* gehörige Arten der Flederhunde und über *Megaderma cor*.

Juli. Aug. *Jacobi*—Beitrag zur Zeitbestimmung Kalidása's.

THE ROYAL PRUSSIAN ACADEMY OF SCIENCES OF BERLIN.

The Christian Spectator, January 1874.

THE EDITOR.

On the Nature and probable Origin of the Superficial Deposits in the Valleys and Deserts of Central Persia, by W. T. Blanford, F. G. S.

THE AUTHOR.

The Indian Antiquary, December, 1873.

*Major J. W. Watson*—Legend of the Ráni Tunk. *Rev. C. E. Kennet*—Notes on the Saiva-siddhánta. *Rev. F. J. Leeper*—The Naladiyar. *A. C. Burnell*.—On the Colossal Jain Statue at Karkala. *J. Burgess*—Papers on Satrunjaya and the Jains. *G. H. Damant*—Legends from Dinájpúr. *H. H. Ráma Varma*—Inscriptions in the Pagodas of Tirkurangudi in Tinneveli and of Suchindram in South Travancore.

THE GOVERNMENT OF INDIA.

Report on the Financial Results of the Excise Administration in the Lower Provinces for 1872-73.

THE GOVERNMENT OF BENGAL.

Report of the Land Revenue Settlement of the Lucknow District, by Mr. H. H. Butts, Offg. Settlement Officer.

Report upon the Revenue Administration in the Province of Oudh for 1872.

Fyzabad Settlement Reports Nos. 2 and 3, 1865, by P. Carnegy.

Historical Sketch of Fyzabad Tehsil, including the former Capitals, Ajudhia and Fyzabad, by P. Carnegy, (Illustrated with Photographs).

Selections from Records,—Groves.—Indebtedness of Cultivators.—Sardah Canal.

Annual Report upon the Administration of the Province of Oudh for 1871-72 and 1872-73.

THE CHIEF COMMISSIONER OF OUDH.

Report on the Sanitary Administration of the Panjáb for 1872.

THE GOVERNMENT OF THE PANJAB.

Annual Report of the Sanitary Commissioner with the Government of India for 1872.

THE SANITARY COMMISSIONER.

Report on the Administration of the Central Provinces for 1872-73.

THE CHIEF COMMISSIONER OF THE CENTRAL PROVINCES.

Reports on the Administration of Mysore for 1866-67 to 1871-72.  
6 Vols.

THE CHIEF COMMISSIONER OF MYSORE.



*Purchase.*

Comptes Rendus, Vol. 77 Nos. 5-13.

No. 8. *M. P. Bert*—Recherches expérimentales sur l'influence que les changements dans la pression barométrique exercent sur les phénomènes de la vie.

No. 10. *M. Facchini*—Nouvelles observations relatives à la présence du Magnésium sur le bord du Soleil, et réponse à quelques points de la théorie émise par M. Faye.

No. 11. *M. Ch. Pellier*—Les déjections cholériques, agent de transmission du Choléra.

No. 12. *M. P. A. Fèvre*—Recherches thermiques sur la condensation des gaz par les corps solides (suite): Absorption de l'hydrogène par le noir de platine. *M. P. Truchot*—Sur la proportion d'acide carbonique existant dans l'air atmosphérique. Variation de cette proportion avec l'altitude.

No. 13. *MM. E. Mathieu et F. Urbain*—Du rôle des gaz dans la coagulation de l'albumine. *M. Déclat*—Sur un nouveau traitement du choléra et probablement de la fièvre jaune par l'acide phénique et le phénate d'ammoniaque au moyen des injections sous-cutanées.

Journal des Savants, Septembre, 1873.

Revue Archéologique, Septembre, 1873.

Revue et Magasin de Zoologie, No. 9, 1873.

(Review.) *The Thanatophidia of India*—Description des serpents venimeux de la péninsule indienne, par M. J. Fayer.

Revue des Deux Mondes, Vol. CVI. No. 4, Vol. CVII. Nos. 1, 2, 3.

1st Sept. *M. C. Lérèque*—Le sens du Beau chez les Bêtes—Le Darwinisme. Psychologique et la Psychologie comparée.

The L. E. and Dublin Philosophical Magazine, September, and October, 1873.

September. *E. Edlund*—An enquiry into the nature of Galvanic Resistance, together with a Theoretic Deduction of Ohm's Law and the Formula for the Heat developed by a Galvanic Current. *G. B. Airy*—Experiments on the Directive power of large Steel Magnets, of bars of Magnetized Soft Iron and of Galvanic Coils in their action on External small Magnets. *Lord Rayleigh*—On the Nodal lines of a Square Plate. *A. Barthélemy*—On the Passage of Gases through Colloid Membranes of Vegetable Origin. *M. M. Champion and Pellet*—On Explosions produced by High Tone.

October. *A. Tribe*—Specific-gravity Bottle for Liquids spontaneously Inflammable in contact with Air.

The Annals and Magazine of Natural History, September, and October, 1873.

September. *H. W. Bates*—On the Longicorn *Coleoptera* of Japan. *Dr. A. Günther*.—Report on a collection of Fishes from China. *Dr. J. E. Gray*—On the Black and Ashy Grey Double-horned Asiatic Rhinoceroses. *M. L. Cienkowski*—On *Noctiluca miliaris*, Sur. *Dr. J. E. Gray*—Sponges from Ceylon. *Profr. T. Thorell*—Necessity of a Common Language in Natural Science.

October. *H. W. Bates*—On the Longicorn *Coleoptera* of Japan. • *Dr. J. E. Gray*—Additional Notes on the Form of the Bones in the Sternum of very young Tortoises and their Development. *Dr. C. F. Lütken*—On Spontaneous Division in the *Echinodermata* and other *Radiata*. *J. Wood-Mason*—On *Rhopalorhynchus Kröyeri*, a new genus and



species of *Pycnogonida*. *J. Wood-Mason*—Note on certain species of *Phasmidae* hitherto referred to the genus *Bacillus*.

The Quarterly Journal of Science, No. XL. October, 1873.

*H. C. Sorby*.—On Comparative Vegetable Chromatology.

The American Journal of Science, August, and September, 1873.

August. *A. M. Mayer*.—On the effects of Magnetization in changing the Dimensions of Iron and Steel bars, and in increasing the Interior Capacity of Hollow Iron Cylinders.

*J. D. Dana*.—On some results of the Earth's Contraction from cooling. Part IV, Igneous Ejections, Volcanoes.

September. *J. D. Dana*.—On some results of the Earth's Contraction from cooling; Part V., Formation of the Continental Plateaus and Oceanic Depressions. *E. W. Morley*.—Apparatus for rapid filtration.—Birds with Teeth.—Petroleum of Upper Burmah.—India-rubber or Caoutchouc of Upper Burmah.

The Westminster Review, October, 1873.

Pratna karma Nandini, Vol. VI, No. 8.

Harold's Coleopterologische Hefte, IX-X.

Monographie der Gattung *Trox*.—Literatur.

### Exchange.

Nature Nos. 110-114.

The Athenæum. August and September, 1873.

Ocean Highways, Vol. 1, Nos. 1-9, April to Dec., 1873.

No. 1. The Caspian and the Region to the Eastward. *Dr. F. P. Smith*.—The great Rivers of China.

No. 2. *C. E. Austin*.—Railway communication between London and Calcutta. *Prof. A. Vambéry*.—The Steppes to the North of Bokhara. The Naga Hills. (Surveying work of Major H. H. Godwin-Austen).

No. 3. *Captain A. D. Taylor*.—The Harbours of India.

No. 4. *Rev. G. P. Badger*.—Khiva or Khuwarizm.

No. 5. *Col. H. Yule*.—On Northern Sumatra and especially Achin. *Rev. G. P. Badger*.—The Oxus. *Commander A. D. Taylor*.—Indian Harbours; II. *R. Michell*. Travels of M. Fedchenko in Kokand.

No. 6. *Rev. G. P. Badger*.—Transoxiana.

No. 7. Narrative of a visit to the Kuh-i-Khwajah in Sistan. *A. W. Dilke*.—A visit to Kuldja.

No. 8. *Baron F. von Richtshofen*.—Distribution of Coal in China.





PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR FEBRUARY, 1874.

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The Annual Meeting of the Society was held on Wednesday, the 4th February, 1874 at 9 o'clock, P. M.

Col. H. Hyde, R. E., President, in the chair.

According to the Bye-laws of the Society, the President ordered voting papers to be distributed for the election of Officers and Members of Council for 1874, and appointed Messrs. Waldie and Peterson, scrutineers.

The President then called upon the Secretary to read the Annual Report.

ANNUAL REPORT FOR 1873.

In submitting their Annual Report on the state of the Society's affairs during 1873, the Council have to congratulate the Society on its unusually flourishing condition, shown not only by the improved state of its funds, but also by the increase in the number of members and the extension of its sphere of usefulness.

The improvement in the state of the funds of the Society is owing to the fact of the Government of India having recognised the claims of the Society to an allowance as House-rent, pending the completion of the New Museum, and granted them the sum of Rs. 400 monthly on this account with effect from 23rd March, 1871, the date fixed by the Indian Museum Act for the completion of the New Museum Building. The sum in arrears, thus placed at the Society's disposal, has enabled the Council to clear off all liabilities, to carry out repairs of the Society's property most urgently called for, and yet leave a considerable balance which has been funded.

The number of elections during the year under review has been 44, including one life member, against 25 of the previous year, and exceeding the average of the last five years by 2.

During the last 12 months, the Society has lost 18 ordinary members by withdrawal, 2 by cancelling and 6 by death, in all 26, leaving a net increase of 18 ordinary members.



At the commencement of 1873, there were 438 ordinary members on the list, but in accordance with the provisions of rule 14 b, the names of 98 who had been absent from India upwards of 3 years and were not likely to return, have been struck off, so that there will now be a total of 340 + 18, or 358 ordinary members on the list.

Of these 358 members, 62 are absent from India, of whom six are subscribing members and three are life members, thus making a total of 302 paying members, of whom 116 are resident and 186 non-resident. The names of 23 of the latter have to be removed to the absentee list under rule 14 b.

The table below shows the fluctuations of members during the last 10 years, but it must be remembered that the diminution this year is only apparent, being caused by the striking off of absentees who could not be considered in any way as members of the Society.

Year.	Paying.		Absent.	Total.
	Resident.	Non-Resident.	Non-Paying.	
1864	228	(133, 195)	92	320
1865	267	(136, 131)	109	376
1866	293	(124, 169)	94	387
1867	307	(154, 153)	109	416
1868	294	(159, 135)	133	427
1869	304	(162, 142)	138	442
1870	266	(134, 132)	148	414
1871	286	(112, 174)	160	446
1872	277	(105, 172)	2L.M. 159	438
1873	302	(116, 186)	3L.M. 53	358

Among those who have been lost to the Society by death, the Council have to record with much regret the names of Dr. J. P. Colles, V. Irwin, Esq. late of the Bengal Civil Service and Lieut. J. H. Bourne late of Shillong, Messrs. N. T. Davey of the Revenue Survey, W. McLaren Smith of the Presidency College and Dr. J. L. Stewart.\*

The elections of C. P. Bird, Esq., C. S. and Col. H. Drummond have been cancelled at their own request.

#### Museum.

The Council continue to carry out the provisions of Act XVII. of 1866 and transfer all Natural History and Archæological donations received by them to the Trustees of the Indian Museum.

The Trustees on the part of the Society were Mr. W. S. Atkinson, Mr. H. F. Blanford, Col. H. Hyde, R. E., who succeeded Dr. T. Oldham as President of the Society, and Col. J. E. Gastrell, who was permanently

\* Since the report was submitted the Council have received with great regret intelligence of the demise of Mr. E. Blyth, an Honorary Member of the Society.



appointed on the departure of Dr. F. Stoliczka to accompany the Yarkand Mission.

#### Finance.

The Council have great pleasure in reporting that the Financial position of the Society is in a more satisfactory state than it has been for some years past.

As already mentioned, this is principally owing to the fact that the Government have granted the Society an allowance of Rs. 400 per mensem from 23rd March, 1871, the date fixed by Act XVII. of 1866 for the completion of the New Museum building till such time as it shall be ready for the accommodation of the collections of the Indian Museum. This allowance has been regularly drawn since April last, and the sum of Rs. 9,316-2-1 the amount of arrears accruing to the Society from 23rd March, 1871, has been realised and Rs. 5,700 of it funded.

This increase in the income of the Society has enabled the Council to sanction larger expenditure on account of the Journal and Library than was allotted in the Budget Estimate at the beginning of the year. They have also been able to meet many urgent requirements for the benefit of the Society. Thus the exterior of the Society's premises has been repaired at an expense of Rs. 3,500, and Rs. 1,075 has been granted for cleaning and repairing some of the most valuable portraits and pictures in the Society's collection, which required immediate care. Also extra expenditure on account of Journal, Rs. 4220 was sanctioned.

The amount realisable from the paying members now on the rolls (116 residents and 180 non-residents at the rates of Rs. 48, and 24 respectively) is Rs. 9,888, besides Rs. 72 from six subscribing members in Europe who pay Rs. 12 under Rule 14 b of the Bye-Laws.

The subscriptions actually realised have, however, only amounted to Rs. 7,200, besides Rs. 1096 of arrears, making a total of Rs. 8,296. This sum, though falling short of the amount due, is in excess of the collection of 1872 by about Rs. 800.

The admission fees of new members have amounted to about twice as much as in the previous year, and the proceeds of the sales of publications have exceeded those realised in 1872 by about Rs. 300. The Library sales have also yielded about Rs. 100 more than in the previous year.

The assets consisting of—

Government Securities, .....	Rs. *7,700	0	0
Funded, .....	332	0	0
Cash balance, .....	393	15	10
Balance in the Bank of Bengal,.....	3,392	14	6

amount altogether to Rs. 11,819-0-0, (exclusive of outstandings amounting

\* Rs. 2000 from the savings of previous years and Rs. 5,700 from those of 1873.



to Rs. 8,740, the greater portion of which is on account of arrears of subscriptions.) The Council have ordered the funding of all sums received as compounding fees from life members, and they would further recommend that all admission fees received during the year from new members should also be funded at the close of the year.

The following is a statement shewing the receipts and disbursements of the Society during the last year.

## RECEIPTS.

Subscriptions, .....	Rs. 8,296	2	0
Admission Fees, .....	1,424	0	0
Publications, .....	1,537	0	3
Library, .....	316	6	6
Secretary's Office, .....	9	3	9
Vested Fund, .....	238	4	0
Building, .....	12,916	2	1
Coin Fund, .....	24	0	0
	Rs. 24,761	2	7

Sundries, .....	998	13	10
Balance 1872,			
In the Bank of Bengal, .....	767	9	4
Cash in hand, .....	143	15	2
	Rs. 26,671	8	11

## DISBURSEMENTS.

Publications, .....	7,270	2	10
Library, .....	1,518	13	11
Secretary's office, .....	2,614	0	4
Vested Fund, .....	5,975	9	11
Building, .....	3,539	2	6
Coin Fund,			

Rs. 20,917 13 6

Sundries, .....	1,966	13	1
Balance,			
In the Bank of Bengal, .....	3,392	14	6
Cash in hand, .....	393	15	10

Rs. 26,671 8 11



The following is the Budget of Income and Expenditure for 1874.

**INCOME.**

Subscriptions, .....	Rs.	8000	0	0
Admission Fees, .....		1000	0	0
Publications, .....		1500	0	0
Library, .....		250	0	0
Building, .....		4800	0	0
Sundries, .....		750	0	0
	Rs.	16,300	0	0

**EXPENDITURE.**

Publications, .....	Rs.	4500	0	0
Secretary's Office, .....		2650	0	0
Building Repairs, .....		500	0	0
Do. Taxes, .....		496	0	0
Coin Fund, .....		1000	0	0
Library, .....		3000	0	0
Balance, .....		4154	0	0
	Rs.	16,300	0	0

**Library.**

The Library has received an addition of 900 volumes during the past year the greater part of which are presentations from various learned and scientific institutions and individuals with whom the Society is in correspondence. The Council are also glad to report that on application being made to the various local Governments throughout India for copies of all official papers of general interest to be supplied to the Library, many useful and interesting publications of this kind have been presented to the Library and promises have been received of their regular supply in future.

The plan of inserting in the Library List a short abstract of the titles of the principal articles contained in the different publications received by the Society has been carried out throughout the year, and the Council have reason to believe that the change meets with approval.

367 Sanskrit MSS. have been purchased for the Society and 213 lithographed Sanskrit works at a cost of Rs. 312 for the Society and Rs. 250 for Government on account of the Conservation of Sanskrit MSS.

**Lectures.**

The Council are glad to report that they have been able to organise a series of cold weather lectures on general Science and subjects connected with India, which so far have been fairly attended and will undoubtedly increase the popularity of the Society.



The want has long been felt of some means of the kind of diffusing in India knowledge of the latest European scientific discoveries and for bringing forward information regarding many subjects of Indian or Oriental interest in a more general and popular manner than can be done by papers read at the general meetings. The deficiency of space and the lack of funds have hitherto prevented the Council from carrying out former proposals for this worthy object, but the improvement in the financial condition of the Society has enabled them to try the experiment this year, and it is to be hoped that it will prove sufficiently successful to warrant the continuance of the lectures in future seasons.

#### Journal.

The Journal continues to maintain a high standard of excellence, and many papers of great value have been published during the year.

About 400 pages of the Journal, Part I, have been printed during the year, and they have been illustrated by 9 plates.

300 Pages of Part II have been published with 19 plates. Of the Proceedings 228 pages have been published.

#### Bibliotheca Indica.

During the past year, thirty fasciculi of the Bibliotheca Indica have been issued, comprising portions of nineteen different works.

#### Sanskrit.

In the Sanskrit series, the Council have the satisfaction to notice the completion of several works which had been undertaken some time since. The *S'rauta Sūtra* of Āsvalāyana, containing the liturgy of the Rig Veda, was taken in hand by the late Paṇḍit Rāmanārāyana Vidyāratna, in 1863. After publishing the whole of the text and a portion of its index, the Paṇḍit died, and the work was left in abeyance. Paṇḍit Anandachandra Vedāntavāgīśa has now completed it. The Index extends to 148 pages, and gives in detail the substance of every aphorism of the text. The Paṇḍit has also completed his edition of the *Tāṇḍya Brāhmaṇa*, which he had undertaken in the year 1866. It extends to two volumes, comprising 1896 pages. It is the largest Brāhmaṇa of the Sāma Veda, and gives in great detail the ritual of that work. The Paṇḍit has annexed to it an elaborate table of contents which, it is hoped, will prove useful to oriental scholars.

Professor Bharatachandra S'īromaṇi has completed his edition of the *Dāna Khaṇḍa* of the Hemādri, being the second part of that author's elaborate digest, entitled the *Chaturvarga Chintāmaṇi*. The work extends to 1057 pages, and includes an alphabetical index of the contents, as also of the names of the different authors quoted in the text. As a help to the settlement of the dates of many treatises on Hindu law, this work, it is believed, will prove particularly valuable. Its real author is generally believed to be the celebrated grammarian Vopadeva, though the work is



known by the name of its patron, and the fact of Vopodeva having quoted largely from several of those works which are accepted by some European scholars to be not more than two or three hundred years old, opens a new field of enquiry.

The plan adopted for a complete edition of the *Sāmaveda Saṁhitā* involves great labour and time, and the work is not likely to be brought to completion for some years to come; but the editor, Paṇḍit Satyavrata Sāmasrami, has devoted his attention very diligently to his undertaking, and the Council have every reason to be satisfied with the manner in which he is conducting it. He has issued five fasciculi during the year under report, bringing up the work to the end of the first volume. The different Indexes annexed to the volume are full and complete.

The *Taittirīya Saṁhitā* of the Black Yajur Veda is a very large work. It was first undertaken by the late Dr. Roer, who left the country in 1859, after publishing the first volume of 1072 pages. The second volume was completed by Mr. Cowell. On his retirement from India, in 1864, the late Paṇḍit Rāmanārāyaṇa Vidyāratna was engaged to carry on the work, but his untimely death put a stop to it for a time. Professor Mahes'achandra Nyāyaratna has now charge of the undertaking, and he has completed the fourth volume, bringing up the work to the fourth octad. Two more volumes will complete the work. The Professor has also completed the first volume of his edition of the *Mīmāṃsā Darsana*, and issued two fasciculi of the second volume.

The *Agni Purāṇa* was undertaken, in 1868, by the late Paṇḍit Harchandra Vidyābhushaṇa who died after bringing out three fasciculi, and the work had to be left in abeyance for a time. Bābu Rājendralāla Mitra has lately taken it in hand, and completed the first volume, comprising about one third of the work.

Of Professor Rāmamaya Tarkaratna's edition of the Artharva Upanishads two fasciculi have been published, comprising the *Āruneya*, the *Brahma-vidyā*, the *Kshurika*, the *Chulika*, the *Sikhā*, the *Brahma*, the *Pránāgni-hotra*, the *Nīla-rudra*, the *Kanṭhasruti*, the *Pinda*, and the *Rāmatāpani* Upanishads, with the commentary of Nārāyaṇa. With the exception of the *Rāmatāpani*, which was some time ago edited by Professor Weber in the Roman character, but without a commentary, these treatises are little known, and will prove valuable accessions to the published philosophical literature of the Hindus.

Paṇḍit Chandrakānta Tarkálankára has published the fourth fasciculus of the Gobhila Sūtra, with an original commentary by himself. The work will be completed in course of the current year.

In compliance with a suggestion lately received from Professor Max Müller the Council have resolved to send to press in course of the



current year two very important works on the Vedic literature, viz. the *Aitareya Aranyaka* of the Rig Veda and the *Brihaddevatā* of Saunaka. Bábu Rájendralála Mitra has already collected ample materials for a good edition of the first named work, and the task of collation is in progress. MSS. of the Brihaddevata are exceedingly rare, but the Bábu has a good MS. of it of his own, and two others have been lent him by his correspondents at Benares. He expects ere long to obtain a sufficient number of MSS. to be in a position to go to press.

Some time ago Dr. J. Eggeling undertook to prepare an edition of the *Kātantravritti*, an old treatise on grammar, for the Bombay Government, but circumstances prevented his sending it to press. He has since obligingly placed his MS. at the disposal of the Council, and it has since been made over to the printer.

The Council have been for some time anxious to bring out in the Bibliotheca Indica an edition of the celebrated poems of Chand, comprising a history of Prithvi Ráj, the last Hindu King of Dihli; but owing to various causes could not do so. They have now the satisfaction to announce that the work has now been sent to press, and a first fasciculus has already been published. The great extent and extremely troublesome character of the work have rendered it necessary to entrust the undertaking to two editors, the first twenty-two cantos being placed in the hands of Mr. Beames, and the succeeding forty-seven in that of Dr. Hoernle.

#### *Arabic and Persian.*

In the Arabic and Persian Series, there were issued during 1873, twelve fasciculi, viz. one Arabic, eight Persian, and three Translations from Persian into English.

ARABIC.—Maulawí 'Abdul Hai, of the Calcutta Madrasah, issued a supplement to Fasc. X. of the IVth Volume of *Al-Iṣṣāḥ fī tamīz il-ṣiḥāḥ*, a biographical dictionary, chiefly of 'witnesses' who knew Muhammad, written by the renowned Ibn Hajar 'Asqalání. When the work, in 1853, was commenced, no complete MSS. appear to have existed, and Dr. Sprenger, assisted by several Maulawis, issued thirteen fasciculi (viz. 12 fasc. forming Vol. I., up to the end of *re*, and one fasc., the beginning of Vol. II, containing the letter *ze* and a few pages of *sin*), containing biographies of 3070 'male witnesses.' The work, thus far advanced, was dropped in 1856, from want of MSS. In 1864, it was determined to complete the dictionary as far as was possible, and the IVth Volume was commenced, of which Maulawí 'Abdul Hai has now issued the last portion. The volume itself forms a distinct part of the whole, inasmuch as it contains the names of 1254 male witnesses, whose names commence with the words *abú*, and the names of 1543 'female witnesses' of the Prophet. Of the whole work, therefore, the Society has issued Vols. I. and IV, and the beginning of Vol.



II. Frequent efforts were made to obtain MSS. for the wanting portions of Vols. II and III, but without result, when during last year three MSS. unexpectedly turned up in the possession of Maulawí Kabíruddín Ahmad, viz. one MS. of Vol. II, and two MSS. of Vol. III. Maulawí 'Abdul Hai is now engaged in preparing Vol. II for press, assisted by the *Usud ulghábah*, the *Istiáb* and the *Ikmál*, works which much resemble the *Iqábah*. There is, therefore, every hope of completing this important work.

PERSIAN.—Mr. Blochmann issued Fasc. XVI. of his quarto text edition of the *Aín i Akbarí*, which completes the geographical index of the work. Fasc. XVII, containing the preface, title, &c., to Vol. I, is about to appear.

Maulawí Zulfaqár 'Alí, of the Calcutta Madrasah, has issued two fasciculi of the *Farhang i Rashídí*, by 'Abdurrahíd of Tattah, one of the most critical scholars India has produced. Three-fourths of the dictionary, as far as the letter *qáf*, have now been issued.

Maulawí 'Abdurrahím, of the Calcutta Madrasah, has completed his index to *Kháfi Khán's* history, and Maulawí Kabíruddín has issued the concluding pages of the work itself. The Bibliotheca Indica edition of *Kháfi Khán's Muntakhab ul-Lubáb* is, therefore, now complete. The work consists of two volumes. The first contains the reigns of Bábar, Humáyún, Akbar, Jahángír, and Sháhjahán; and the second contains an account of the reign of Aurangzib (as far as the author had sources to consult), the reigns of Sháh 'Alam Bahádúr (who is generally but wrongly called in English histories 'Bahádúr Sháh'), of Jahándár Sháh, Farrukh Siyar, Rafi 'uddaraját, Rafi 'uddaulah, and the beginning of the reign of Muhammad Sháh, up to A. H. 1135, or A. D. 1722-23.

Maulawí 'Abdul Hai has issued an Index of Persons and of geographical names occurring in the '*Alamgírnámah*', together with a biographical notice of the author. The text itself was issued in the Bibliotheca Indica in 1868. The work contains a history of the first ten years of Aurangzib's reign, i. e. till A. H. 1078, or A. D. 1667, when the emperor forbade historians to write the history of his reign.

Maulawí Ághá Ahmad 'Alí completed during last year the *Madásir i 'Alamgírí*, a history of Aurangzib's reign, written in A. H. 1122, or A. D. 1710, by Muhammad Sáqí Musta'idd Khán. The author had been for some time in the service of Bakhtáwar Khán, the author of the *Mír-at ul 'Alam*, and was through his influence appointed a *Waqá'nigár*, or court-news-writer. He was then put in charge of the emperor's carpet for prayer (*já-namáz*), and later he was appointed officer in charge of the household servants. Four years before the emperor's death, he was appointed a secretary of finance (*inshá i nazárat*), and his office as news-writer was bestowed upon his son Muhammad Muhsin. Although his work is short, it is of the greatest importance, because it



is the only reliable native history of Aurangzib's reign that we possess. The author is most exact in his chronology, and his work will be found by historians to be an excellent check on the confused and frequently interrupted account of Kháfi Khán. It was no doubt owing to this fact that the author of the *Tazkirat ussaláfin i Chaghtáiyah* used the *Maásir i 'Alamgiri* for his account of Aurangzib's reign in preference to Kháfi Khán's work.

Maulawí Aghá Ahmad 'Alí's edition is completed in six fasciculi, the last of which is accompanied with a useful Index of Persons and Geographical names, and a short account of the author himself.

The Society has also issued during last year the *Haft Asmán* by Maulawí Aghá Ahmad 'Alí. This work contains a most interesting history of the Masnawí, or epic poetry, of the Persians, and constitutes the editor's introduction to Nizámí's *Sikandarnámah i Bahrí* (or *Khiradnámah i Sikandari*), which was edited for the Bibliotheca Indica by Dr. Sprenger, Aghá Muhammad Shustarí, and Aghá Ahmad 'Alí, in 1852 and 1869. As Persian epics are written in seven metres, Maulawí Aghá Ahmad 'Alí gave his Introduction the title of 'Haft Asmán,' or 'the Seven Heavens.' Unfortunately, Aghá Ahmad 'Alí died at Dháká in June last, and only the general portion and the first of the seven chapters have been completed. But incomplete as it is, the Introduction will be found to contain a most valuable account of the history of the Persian epic and full notes on Nizámí's works.

The death of Maulawí Aghá Ahmad 'Alí has deprived the Bibliotheca Indica of a most painstaking editor. During the years 1865 and 1878, he edited for the Society the epic *Wis o Rámin*, the first and third volumes of *Baddoni's* history, the *Iqbálnámah i Jahángiri* (jointly), the *Maásir i 'Alamgiri*, one-half of Nizámí's *Sikandarnámah*, and the first two fasciculi of Abul Fazl's *Akbarnámah*. He was enthusiastically devoted to Persian Literature. Besides the *Haft Asmán*, which he compiled for the Society, he published in 1865 and 1868 his *Muayyid i Burhán* and the *Shamsheer i Teztar*, two important lexicographical works; the *Risálah i Turánah*, an essay on the Rubá'i of the Persians, in 1866; and in 1872 the *Risálah i Ishtiqáq*, an elementary Persian grammar.

Abul Fazl's *Akbarnámah*, which Maulawí Aghá Ahmad 'Alí had commenced to edit, has been entrusted to Maulawí 'Abdurrahím, of the Calcutta Madrasah, and Mr. Blochmann has promised to superintend the edition as far as the names of persons and the geography of the work are concerned.

TRANSLATIONS. Of translations from Persian into English, the Society published during 1873 the first two fasciculi of Major Raverty's translation of the *Tabaqát i Náçirí*, which is being printed in England. The third and fourth fasciculi (as far as page 392) have likewise been printed,



and are on their way out to India. Mr. Blochmann issued Fasc. VII of his translation of the *Āin i Akbarī*, which completes the first volume of the work, and contains a full index and Abul Fazl's biography.

In February last, the Council, at the recommendation of the Philological Committee, also sanctioned the printing of the English translation of Badāonī's history by Capt. G. F. J. Graham, Benares. The first fasciculus of the work is about to be issued.

In the end of last year, the Society also received, through the Foreign office, a MS. translation by Col. E. C. Ross, Political Agent, Muscat, of the *Kashf ulghummaḥ*. This rare Arabic work was written by Shaikh Sirhān bin Sa'id bin Sirhān bin Muhammad, of the Banū 'Alī tribe, in or about 1728 A. D., and contains an interesting account of the history of 'Omān. The translation will be issued during 1874.

The following are the names of the different works issued during the last year.

#### *Sanskrit.*

The *Srauta Sūtra* of *Āsvalāyana*, with the commentary of *Gārgya Nārāyana*, edited by *Rāmanārāyana Vidyaratna*, No. 269, Fas. XI.

The *Tāpdyā Mahābrāhmaṇa* with the commentary of *Sāyaṇāchārya*, edited by *Ānandachandra Vedāntavāgīśa*, No. 268, Fas. XIX.

The *Chaturvarga-Chintāmaṇi* by *Hemādri*, edited by Professor *Bharatachandra Śīromaṇi*, Part II, *Dānakhaṇḍa*, Nos. 267, 274, 278, 281, and 290, Fas. VII-XI.

The *Sāma Veda Sañhitā* with the commentary of *Sāyaṇāchārya*, edited by *Satyavrata Sāmasramī*, Nos. 270, 280, 285, 286, and 293, Fas. VI-X.

The *Sañhitā* of the Black *Yajur-Veda* with the commentary of *Mādhavāchārya*, edited by *Paṇḍita Mahes'achandra Nyāyaratna*, No. 231, Fas. XXVII.

The *Agni Purāṇa*, a system of Hindu Mythology and Tradition, edited by *Bābu Rājendralāla Mitra*, No. 291, Fas. IV.

The *Ātharvanopanishads* with the commentary of *Nārāyaṇa*, edited by *Rāmamaya Tarkaratna*, Nos. 276, and 282, Fas. III-IV.

The *Gobhiliya Grihya Sūtra* with a commentary by the editor, edited by Professor *Chandrakānta Tarkālankāra*, No. 277, Fas. IV.

The *Mimāṃsā Darsana* with the commentary of *Savara Svāmin*, edited by *Paṇḍita Mahes'achandra Nyāyaratna*, No. 208, Fas. IX.

#### *Hindī.*

The *Prithirāja Rāsau* of *Chand Bardai*, edited in the original old Hindi by *John Beames*, B. C. S. Part I, Fas. I, No. 269.



*Persian.*

The *Maásir-i-'Álamgíri* of Muhammad Sáqí Musta'idd Khán, edited by Maulawí Aghá Ahmad 'Alí, No. 289, Fasc. VI.

The *Muntakhab-ul-lubáb* of Kháfi Khán, edited by Maulawí Kabír ud-dín Ahmad, No. 292, Fasc. II.

The *Áin-i-Akbarí*, by Abul Fazl i Mubárák i 'Allámí, edited by H. Blochmann, M. A., No. 276, Fasc. XVI.

The *Farhang-i-Rashídí* by Mullá 'Abdur Rashíd of Tattah, edited and annotated by Maulawí Zulfaqár 'Alí, Nos. 271, and 279, Fasc. IX and X.

The *Akbarnámah* by Abul Fazl i Mubárák i 'Allámí, edited by Aghá Ahmad 'Alí, Nos. 283, and 284, Fas. I and II.

The *Haft Ásmán*, or History of the *Masnawí* of the Persians, being an introduction to Nizámí's *Iqbálnámah-i-Sikandari*, by the late Maulawí Aghá Ahmad 'Alí, No. 294.

Index of Names of Persons and Geographical names occuring in the '*Álamgír-námah*, by Maulawí 'Abdul Hai, No. 288.

*Arabic.*

A Biographical Dictionary of Persons who knew Muhammad, by Ibn Hajar, edited by Maulawí 'Abd-ul-Hai, No. 232, Fasc. 20, Supplement.

*Translations.*

The *Áin-i-Akbarí* of Abul Fazl i 'Allámí, translated from the original Persian by H. Blochmann, M. A., No. 287, Fasc. VII.

The *Ṭabaqát-i-Nāqirí* of Minháj-i-Siraj, translated from the Persian by Major H. G. Raverty, Nos. 272, and 273, Fas. I and II.

**Coin Cabinet.**

During the year 1873, the Coin Cabinet of the Society received an addition of one silver coin, eight copper coins, a brass token of Muhammad Tughluq and a cast of a Bengal coin of Firúz Sháh II.

All these are presents from members. One gold coin of Diodotus was purchased.

Steps have also been taken to commence cataloguing the collection. Mr. Blochmann has arranged the Bengal coins, and Maulawí 'Abdul Hai has classified a portion of the Dihlí coins under Col. Hyde's superintendence at the Mint.

**Officers.**

Mr. Blochmann and Capt. J. Waterhouse have retained charge throughout the year of the editing of the Philological part of the Journal and the



Proceedings and of the other duties of their respective Secretaryships. On the departure of Dr. F. Stoliczka with the Yárkand Mission, in May, Mr. J. Wood-Mason was appointed Natural History Secretary and has since edited the Natural History part of the Journal.

The office of Financial Secretary and Treasurer has been held by Col. J. E. Gastrell.

The Council have the pleasure to again record their satisfaction with the services rendered by Bábu Pratápachandra Ghosha, the Assistant Secretary, and with the work performed by Bábu Manilal Baishak, Assistant Librarian, Sayyid Walíullah, store keeper, and Babu Buddinath Baishak, cashier.

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*List of Societies and other Institutions with which exchanges of publications have been made during 1873.*

- Batavia :—Société des Sciences des Inderlandes.  
 Berlin :—Royal Academy.  
 Birmingham :—Institution of Mechanical Engineers.  
 Bombay :—Royal Asiatic Society.  
 Boston :—Natural History Society.  
 Bordeaux :—Bordeaux Academy.  
 Buenos Ayres :—Public Museum.  
 Bruxelles :—Académie Royale des Sciences, &c., de Belgique.  
 Cherbourg :—Société Nationale des Sciences Naturelles.  
 Calcutta :—Agricultural and Horticultural Society of India.  
 ——— :—Geological Survey of India.  
 Christiania :—University.  
 Copenhagen :—Royal Society of Northern Antiquaries.  
 Dacca :—Dacca News and Planters' Journal.  
 Dehra Dun :—Great Trigonometrical Survey.  
 Dublin :—Royal Irish Academy.  
 ——— :—Natural History Society.  
 Edinburgh :—Royal Society.  
 Geneva :—Physical and Natural History Society.  
 Königsberg :—Physical and Economical Institution.  
 Láhor :—Agricultural Society of the Panjáb.  
 Leipzig :—Deutsche Morgenländische Gesellschaft.  
 Liège :—Société Royale des Sciences.  
 Liverpool :—Literary and Philosophical Society.  
 London :—British Museum.  
 ——— :—Royal Society.



London :—Royal Asiatic Society of Great Britain and Ireland.  
 ——— :—Royal Institution.  
 ——— :—London Institution of Civil Engineers.  
 ——— :—Royal Geographical Society.  
 ——— :—Museum of Practical Geology.  
 ——— :—Zoological Society.  
 ——— :—Statistical Society.  
 ——— :—Geological Society.  
 ——— :—Linnean Society.  
 ——— :—Athenæum.  
 ——— :—Anthropological Society.  
 ——— :—Nature.  
 ——— :—Royal Astronomical Society.  
 ——— :—Ocean Highways.  
 ——— :—Agricultural Society.  
 Moscow :—Société des Naturalistes.  
 Munich :—Royal Academy.  
 Madras :—Government Central Museum.  
 Manchester :—Literary and Philosophical Society.  
 New York :—Commissioners of the Department of Agriculture.  
 New Haven :—Connecticut Academy of Arts and Sciences.  
 Netherlands :—Royal Society.  
 Paris :—Ethnographical Society.  
 ——— :—Geographical Society.  
 ——— :—Asiatic Society.  
 ——— :—Anthropological Society.  
 Stettin :—Entomological Society.  
 St. Petersburg :—Imperial Academy of Sciences.  
 Stockholm :—Royal Academy of Sciences.  
 Vienna :—Imperial Academy of Sciences.  
 ——— :—Anthropological Society.  
 ——— :—Zoological and Botanical Society.  
 ——— :—Imperial Geological Institute.  
 Washington :—Smithsonian Institution.

On the motion of the President, the Report was adopted. The Scrutineers reported the elections of officers and Members of Council for 1874 as follows :—

Col. H. Hyde, R. E.

*President.*

Bábú Rájendralálá Mitra.

The Hon. E. C. Bayley, C. S. I.

The Hon. J. B. Phear.

} *Vice-Presidents.*



H. Blochmann, Esq., M. A.	}	<i>Secretaries and Treasurer.</i>
J. Wood-Mason, Esq.		
Captain J. Waterhouse.		
Col. J. E. Gastrell.		
Col. H. Hyde, R. E.	}	<i>Members of Council.</i>
Babú Rájendralala Mitra.		
The Hon. E. C. Bayley, C. S. I.		
The Hon. J. B. Phear.		
Col. H. L. Thuillier, R. A., C. S. I.		
The Hon'ble Raja Romanáth Tagore.		
W. L. Heeley, Esq., C. S.		
L. Schwendler, Esq.		
J. Geoghegan, Esq.		
Dr. S. B. Partridge.		
H. B. Medlicott, Esq.		
Col. J. E. Gastrell.		
H. Blochmann, Esq., M. A.		
J. Wood-Mason, Esq.		
Captain J. Waterhouse.		

The President then read the following Address—

### PRESIDENT'S ADDRESS.

GENTLEMEN,—Being called to fill the Office of President of this Society, I do so with some diffidence, for I feel that coming after one having such great and varied ability as had Dr. Oldham our late President, I am very unequal to the task I have taken up, and I fear that I can only follow at a long distance the steps of my predecessor. All, however, that it is in my power to effect shall be done, and if I am not able to enter so deeply into many of the questions that come before us, I trust I may be able to extend the influence of the Society and to promote the objects for which it has been established.

The Report which has been just read to you will, I trust, justify my congratulation on our improved position in every way. The Society now enjoys a permanent income, at present in the shape of an allowance from Government as compensation for loss of house-rent that the Society would have realized from the rent of this house, had the Museum Building been completed. This will be paid until the Society is able to occupy their new quarters. The building we now occupy, will then be available for letting on lease, and will produce a net income, certainly equal to and perhaps more than the present grant.



This grant from the Government of India was intimated to you in a note attached to the President's address of last year, and I think the thanks of the Society are due to the Government of India for the equitable decision arrived at and for the grant given.

The Council have been, and are now, in communication with the Secretary to the Government of Bengal, Public Works Department, (in whose province the construction of the Museum Building rests) regarding the detail arrangements of that part of the building which is, under the Act, to afford fit accommodation for the Society.

It does not appear that when the building was designed, any specification was drawn out, while it is certain that nothing but the drawings of the bare shell of the building were submitted to the Council of the Society. This has been represented, and a complete specification, describing all those details that are absolutely necessary to render the building fitted for the specific purpose of accommodating the Society, is being drawn out, and the Council have no doubt but that the Society will find the accommodation liberally provided and all that can be desired.

During the past year, the Society have lost the services of our late able Secretary, Dr. Stoliczka. It will be remembered that early in the year the Council learning that the Government of India contemplated sending a Mission to Yarkand, and following the former practice of the Society, addressed Government with offers of co-operation and assistance in furthering the Scientific objects of the Mission. The offer of the Society was cordially received, and a Memorandum of Subjects of Scientific observation was drawn out and furnished to Government for use of the expedition. Some short time afterwards the Council, looking to the great difficulties that would be met in securing and forwarding sufficient geological specimens from Yarkand, made a representation to the Government of India, and pointed out the necessity of attaching to the expedition a Palæontologist in order that in the event of it not being found practicable to secure and forward to India sufficient geological specimens, his special knowledge might come to his aid, and he might still be able to secure and bring with him such information as will enable the solving of the geological problems of the countries through which he passes.

The Government of India accepted the suggestion, and appointed Dr. Stoliczka to accompany the expedition. Several letters have been received from the Camp and it was some time since with great regret and anxiety that the Council heard of the intense sufferings and dangerous illness of Dr. Stoliczka in the journey across the higher passes.

A letter received a few days ago from Dr. Stoliczka and dated Yarkand, shews us that his determined spirit has carried him through all his difficulties, and it is with great pleasure that I can announce to the Society his return to comparative health.



The first part of the Journal for last year extends over nearly 400 pages, and contains articles of most varied interest. Sir Arthur P. Phayre, who has been a steady contributor to the Journal since 1845, has continued his series of contributions to the History of Burma; the Honorable E. C. Bayley brought several ancient coins of great value to the notice of the Society; Col. E. T. Dalton contributed an interesting paper on the Rude Stone Monuments in Chutiá Nágpúr; Dr. Hoernle followed up his researches into the comparative grammar of the Sanskrit Vernaculars; Chand, the old bard of Delhi, has received continued attention from Messrs. Beames and Growse; Bábu Rájendralála Mitra gave sketches of the condition of people in ancient India, and notes on several Sanskrit inscriptions; and Messrs. Thomas and Blochmann have published contributions to the early Muhammadan History of Bengal.

The splendid collection of rubbings of inscriptions which General A. Cunningham forwarded to the Society, has also for the greater part been published during last year. The collection of Muhammadan Inscriptions, which received valuable additions from Dr. J. Wise, and Messrs. Westmacott, Heeley, Bourke, Beale, and Delmerick, have appeared with translations in the Journal and the Proceedings, and will be continued by your Philological Secretary during the present year. General Cunningham's Sanskrit rubbings are still in the hands of Bábu Pratápachandra Ghosha as also the Copper-plate grant of Keshab Chandra of Bengal, which was lately found in Bákirganj and was presented to the Society by Mr. H. Beveridge.

I will not take up your time with a summary of the work done during last year by the Editors of the Sanskrit and Persian publications. The report on this part of the Society's activity has just been read to you. But I must say a few words regarding the researches in Oriental literature and antiquities, made by some of our members, independent of the Society. General Cunningham issued a few weeks ago the third volume of his Archaeological Report, which treats of the various styles of Hindú and Muhammadan architecture and the antiquities of Mathurá, the neighbourhood of Alláhábád, and the Buddhistic relics of Southern Bihár. The Rev. M. A. Sherring of Benares, one of our Corresponding Members, published in the beginning of last year, a volume on the various Hindú Castes, with interesting genealogical tables and notes on the aboriginal tribe of the Bhars. Mr. J. Beames brought out the first volume of his Comparative Grammar of the modern Aryan Languages of India, which treats of phonetical changes, and is accompanied by a singularly lucid Introduction on the Position of the Seven Vernaculars. The notices of Sanskrit MSS., so well known and valuable to all scholars, have been ably continued by Bábu Rájendralála Mitra. His forthcoming report on Orísá will contain a full account of the antiquities of that province. Mr. Blochmann has published his work



on the "Prosody of the Persians." Among the several District Gazetteers, I have to mention the interesting "Memoir of Mathurá District" by Mr. F. S. Growse which contains exhaustive notes on the Hindú and Muhammadan antiquities of the sacred town and its neighbourhood. Nor must I forget the great numismatic undertaking of the day, which Messrs. Trübner and Co. have set on foot, I mean the publication, under the editorship of Mr. E. Thomas, of the "International Marsden." Scholars of all countries and several members of our Society are to contribute to this comprehensive work, which is to contain the medallic history of the whole East.

While on coins, I would ask those who collect coins with no specific object, and there are many such in this country, to give attention to the important part coins play in throwing light on Indian History. Within the last few months you will find that one coin under Mr. Blochmann, our Secretary, brought to light a forgotten, and in the present age, unknown king, while another accidentally dug up in a field, cleared up a difficulty of three years in the date of another reign. These I know are only examples that come home to us, but they clearly confirm what Prinsep, Thomas, Cunningham and others urge, that coins are the basis and indeed in many cases the beginning and the end of Indian History, and I would therefore call upon all such collectors as cannot read their coins, to lend them to the Society to be read, figured and to be recorded, to add to the rich store already contained in the pages of this part of our Journal.\*

Passing on to Part II of our Journal, which is devoted to the Natural Sciences.

The three parts of the Journal already published and the fourth which will appear in a few days, are illustrated by 19 Plates in all. Dr. F. Stoliczka has given us another important memoir with valuable anatomical notes on Asiatic land Mollusca; notes on some Malayan Amphibia and Reptilia, and on the Indian species of Thelyphonus; a contribution towards a monograph of the Indian species of Passalidæ, an interesting family of Coleopterous insects (which had been already monographed by Dr. Kaup); and notes on Andamanese and Nicobarese Reptiles. Mr. Wood-Mason has described a new and interesting genus and species of decapod Crustaceans remarkable for being totally destitute of functional organs of vision, like the famous cray-fish of the Mammoth-Cave and several allied forms of crustacea recently discovered by the "Challenger." He has also contributed a description of a remarkable new genus and species of Pycnogonida; the first part of a memoir on the Phasmidæ; a note on some species of the same family of Orthopterous insects, and a description of a new genus of Land-Crabs from the

\* I may here note a collection of Sassanian Coins, 547 in number, that have fallen into my hands; these coins will doubtless give great assistance in the work Mr. Thomas is engaged on. They are now in the hands of the Hon. E. C. Bayley.



Nicobars. Three of Mr. Wood-Mason's papers have been reproduced in European Journals and the appearance of Dr. Stoliczka's notes on the Thelyphoni was quickly followed by the criticisms of Mr. A. G. Butler of the British Museum.

I mention these facts as shewing the justness of the remark made in another part of this address to the effect that the writings of our naturalists are not so unknown to their brethren at home as some seem to imagine. Mr. Kurz has given us the second and third fasciculi of his new Burmese Plants and Dr. G. Zeller has described the Algæ collected by Mr. Kurz in Arracan and Burmah. The contributions of Dr. Dobson have been as numerous and as valuable as in former years, the most noteworthy of his communications having been his description of a new and remarkable Bat from Johore, in the Malay Peninsula, and his monograph of the Indian fruit-eating Bats. In Dr. Dobson who left Calcutta a few months ago at the expiration of his term of service in India, the Society has lost a valuable member and the Museum at Netley gained an enthusiastic Curator. Mr. W. Theobald has described and figured some new species of Unios.

A modest work on Physical Geography has been published by Mr. H. F. Blanford which has been written specially for Indian students, and in the latter chapters, contains a description of the Geology and climate of India.

All members of this Society, particularly readers of Part II of the Journal, will have seen how rich the Journal is in contributions to Natural History and will acknowledge how great is our debt to our Secretaries and to those who follow up this study. I could, however, wish that we could congratulate ourselves as much on the contributions of papers on subjects in Natural Physics. We cannot, however, do this, for it will be seen that for years there has been (with the exception of some very able papers on Electrical subjects) a marked absence of Physical Science from our Journal. This is attributed to two causes:

First. From the rapid communication with Europe, the facilities are daily increasing for sending such papers to journals and publications, specially devoted to the subjects in which (according to general opinion) these papers will obtain a wider and more useful circulation among those for whose special study they are intended.

Second. That all those who are qualified to write on Physical Science questions, have so much occupation in the practical work of their life, that time cannot be spared.

I think this is much to be regretted. I would point out that Natural History papers are not lost in our Journal, but on the contrary are quoted throughout Europe, and that the Electrical papers, to which I have alluded, have also been extracted by most scientific journals.

The question is one that calls for our grave consideration, and I would



earnestly ask the attention of every member occupied in scientific pursuits, or whose study is in any way turned to these subjects, to contribute to the Journal such as may come within his knowledge, so that the end of the Society may be better and more generally fulfilled, and that the words of our Founder, viz., "The bounds of its investigation will be the geographical limits of Asia, and within these limits its enquiries will be extended to whatever is performed by man or produced by nature," may be truly and faithfully carried out in their most extended sense.

In the scientific labours of the year, we find that the Survey of India has made marked progress, and has given a considerable addition to our geographical knowledge of the Eastern Frontier.

The geographical exploration of the Frontier has been pushed on vigorously. All the intermediate territories occupied by the Lushais and lying between the Cachar and Munipore Frontier and Hill Tipperah, left undone by the parties with General Bouchier, and General Brownlow's columns in the previous season, have been very successfully described. The Garo Hills, hitherto a perfect *terra incognita*, have likewise under the protection of the military expedition, sent to coerce these refractory quasi-independent people, been well delineated, entirely filling up the blank which has so unaccountably existed for so many years in the Map of India and which separated the long occupied districts Goalparah and Gowhatty on the one side, from Mymensing and Sylhet many years under British rule on the other.

In the Nāga Hills, the Survey has been extended to Sámagúting and to the Manipúr Frontier, and a few seasons more will, it is hoped, fill up all the Hilly Territory subtending the Assam Valley south of the Brahmaputra River.

These Topographical Surveys have been drawn expressly for the purpose of reproduction by the photozincographic process and thus are at once issued for the use of the local officers and the public, a process which it is expected will shortly be superseded by the superior photo-collotype process. This advancement (to a degree hitherto unknown) in the rapidity and excellence of work, must contribute much to the early production and correction of maps, the materials for which in these countries have been obtained under the greatest difficulties which nothing, but the organization, skill, and determination that has ever characterized the Survey Department, could overcome, and I cannot but think that such progress is a subject for the acknowledgement of our Society.

Turning to the Trigonometrical proceedings, we find that the Pendulum operations in India have been completed, that the pendulums have been swung in Bombay, Aden, and Egypt and finally at Kew.

The Tidal observations which Col. Walker, R. E., Superintendent G. T.



Survey, devised, and which arose from the proposals that emanated from Dr. Oldham, our late President, who pointed out that investigations should be made of "the secular changes in the relative level of land and sea which were believed to be going on at various places on the coast of the Bombay Presidency, and more particularly at the head of the Gulf of Cutch," are now being carried out and the whole of the detail of the work is given in the very interesting Report of the Trigonometrical Survey for the year 1872.

During the past year, as a contribution of data for the determining the figure of the earth, the Great Trigonometrical Survey Department has been engaged on certain Electro-Telegraphic determinations of differences of longitude on the parallel of  $13^{\circ}$ .

This arc of parallel was selected for several reasons. It extends from Madras to Mangalor passing through Bangalor about midway. There are Telegraph stations at each of these places and great facilities for communication.

The arc is in  $13^{\circ}$  and is of peculiar interest, in that it is situated much nearer to the Equator than any similar arc which has yet been measured in any part of the globe.

The arc is  $5^{\circ} 24' 12''$  or about 364 miles, and it was on this arc that Col. Lambton first endeavoured in the years 1802-5 to determine the length of a degree of Longitude by the method of observing the astronomical latitudes and azimuths of a series of reciprocating stations along it, a method which though ill-adapted to low latitudes, was the only one then feasible for him to employ. Thus it will be seen that circumstances have necessitated the selection of the same parallel of latitude for the commencement of the determination of longitudinal arcs by the modern Electro-Telegraphic method that was chosen at the commencement of the present century by Col. Lambton for his corresponding investigations.

The detailed description will be found in Col. Walker's Report, but I may note that the operations were carried on under certain difficulties for there was the necessity of employing a Telegraph wire which could only be placed at the exclusive disposal of the observers for a few periods and those very brief, and though the operations were invariably performed during the night, when the ordinary traffic on Telegraph lines is comparatively little, it was found that the unrestricted use of a wire could, as a rule, be only conceded for four periods of 15 minutes each, at intervals of two hours apart; on two nights, however, the use of the wire was granted for two hours at a time, but the then unfavourable state of the weather at Madras prevented this concession from being taken to account there.

The preliminary results alone have as yet been obtained and they give a Telegraphic determination of arc less than the Trigonometrical determination by 13.95 seconds of arc.

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A second edition of the Map of Turkistan containing much new information of the Geography of Central Asia has been published.

The special Trans-Himalayan explorations by native agents are being carried on into the regions beyond the Hindú Kush Range, into that part of Thibet which lies beyond the northern water-shed of the Brahmaputra River at the Desert of Gobi and Great Tibet.

This time last year Dr. Oldham from this chair called your attention to the arrangements for observing the Transit of Venus.

The Government of India early in 1873 expressed their intention of confiding the arrangements for these important observations to Lieutenant-Colonel Tennant, R. E. Some time has unfortunately been lost, when there was little to spare, owing to the Secretary of State for India having at first declined to sanction any instrument except a Photoheliograph, but at the request of the Government of India the necessary supply was ordered in July last. Colonel Tennant has received information that the Photoheliograph will be despatched from England in February and that the very valuable addition of M. Janssen's apparatus for observing the contacts photographically will follow next month. Of the other instruments nothing has been heard. Meanwhile the Government have sanctioned the funds necessary for building an observatory, and Col. Tennant is proceeding with the arrangements at Roorkee. Col. Walker, Superintendent of the G. T. Survey, has been enabled by changes in his Department to make some instruments available, which will partially fill the place of what were ordered from England, and Col. Douglas, R. A. has also contributed some timekeepers.

Col. Tennant proposes to observe at Roorkee where he will be assisted by Captain Campbell, R. E. of the G. T. Survey. He has been authorized to send an Officer (probably Captain G. Strahan R. E.) as far up into the Panjáb as possible to get eye observations of the last contact of Venus and the Sun. If, however, the instruments ordered by the Secretary of State should not arrive, it will be necessary to divert those intended to be sent to the Panjáb.

It is understood that observations will be made at Madras by the Astronomer and at Bombay by the Superintendent of the Kolaba Observatory who, however, has few appliances, and at the Head Quarters of the G. T. Survey Dehra Dún.

Having thus stated what is being done in India, it will be interesting to mention what is in progress elsewhere. The British Government have been long preparing under the superintendence of the Astronomer-Royal to send expeditions to various parts of the world. The stations selected are Alexandria, the island of Rodrigues and Kerguelen's Land in the West and Waahoo, Auckland, N. Z. in the East. A second station near Waahoo will



also be occupied, and Lord Lindsay has undertaken the whole arrangements for an expedition to the Mauritius. Her Majesty's Ship "Challenger" has been instructed to examine proposed stations, the details of which have been published.

The Russian Government have undertaken to provide for 27 Stations in Northern Asia and Eastern Europe. The German Government, it is believed, intend to observe in Persia, at the Mauritius and in New Zealand; and the French occupy the Marquesas Island and, it is believed, Tahiti and a station in China. The American Government propose to place a station on Russian Territory on the Pacific Coast, one at Yokohama, one at Peking and another either in China or Japan, and also to occupy the Sandwich Islands. This is an imperfect sketch as it is difficult to procure full information, but it will suffice to show how great the importance of the observations is felt to be by men of science in all parts of the world.

When the British Association, as the President brought to your notice last year, urged on Government the necessity for measures to observe the Transit of Venus, they at the same time urged the establishment of an Observatory for Solar observations in India. Since then the Council of the Royal Astronomical Society have authorized their President to press on Government the necessity of aid to Astronomical Physics especially by the establishment of a new Observatory in the Highlands of India, or some other part of the British dominions equally favourable for the use of large instruments. It is therefore satisfactory to know that the instruments for the Transit of Venus were applied for and sanctioned for a Solar Observatory. It is hoped that when their immediate purpose in observing the Transit of Venus has been served, no time will be lost in considering how their second end may be best served. There is no part of the British Territory where advantages can be had superior to those offered by the mountain range of India, and it appears incumbent on those who have such facilities for advancing knowledge to turn them to some account.

Turning to the progress made in Physical Science there is not much to bring to your notice. In India, however, Spectroscopic observation is making some progress in the Department of the Great Trigonometrical Survey and the atmospheric lines of the Solar Spectrum are being observed.

Mr. J. B. N. Hennessey has continued observing and mapping the atmospheric lines of the Solar Spectrum, employing in supersession of the instrument formerly used, an excellent three-prism (compound) spectroscope with automatical adjustment belonging to the Royal Society of London. This instrument is placed at a height of about 6,500 feet above sea level, on a projecting spur of the Himalayan range on which the Sanitarium of Mussoorie is located, so that a clear view is obtained of the Sun down to the very horizon; this is essential, for it is only when observed



some 3 or 4 diameters from sun-set that the Solar Spectrum exhibits the atmospheric lines or absorption-bands, though there are some exceptions to this rule; the conditions under which the Spectrum is thus seen are indicated by "Sun-set" in contradistinction to observations made "Sun-high" between 10 A. M. and 2 P. M. the latter Spectrum is already established in Kirchoff's well known Maps, on which the Sun-set Spectrum is now being drawn. Proceeding in this manner, Mr. Hennessey has mapped the atmospheric lines from the extreme red to F, and the results may be expected to appear in due course in the papers of the Royal Society of London.

In my own Department, Minting, there is some reason to hope that Spectroscopic analysis will ere long prove a valuable aid in the operations of refining and assaying. Mr. Chandler Roberts, Chemist of the London Mint, in remarking on the use of the Spectroscope in determining the amount of Gold present in the Gold-Copper Alloy, *i. e.* the Sovereign, writes:—

"In former reports I have shown that the existing method known as the gold parting assay, affords results which are trustworthy to the  $\frac{1}{10000}$  part of the original weight of the assay piece, and without being unmindful of the really wonderful accuracy of the method now used, I am satisfied that in the examination of a series of gold-copper alloys by means of the spectroscope differences of composition more minute than the  $\frac{1}{10000}$  can be readily distinguished. The advantage of the proposed method consists in the fact that the value of a single assay piece, can be determined in a few minutes while an assay by the ordinary method can hardly be completed in less than two hours."

Now,—This comparison of the time occupied, does not give any adequate idea of the practical benefit that would be derived from the perfecting of this system of assay, if it be found to be sufficiently trustworthy; for though the period necessary for the assay will not exceed a few minutes, two hours, which is given as the time necessary for any single assay under favourable circumstances, can never in practice represent the time actually occupied in large operations and which we have never been able to reduce below two days for Silver and one for Gold.

In a paper lately read before the Royal Society, some further information was given regarding the progress of the experiments that are being carried on.

The Qualitative Spectrum analysis is known to depend on the position of the lines. The Quantitative Spectrum analysis, on the other hand, depends on the length, brightness and thickness of these lines.

The position, length and, to a certain extent, thickness are definite exhibitions and are therefore susceptible of accurate measurement, but brightness is not so definite and can only be estimated. For the more accurate reading and recording Spectroscopic analysis photography is now used.



Up to the present the system adopted has been to examine under the spectroscope the unknown alloy together with a check-piece of known composition, and it is found that the most minute differences can be detected.

It will be easily seen then, that before a system of assay by this method could be worked, an accurate map of the spectra due to all the gradations of the alloy table would have to be made, which would be a work of much labour and time, greatly increased by the fact that we constantly detect the presence of several metals at one time in the bullion tendered to the Mint.

There is then much to be done, but still we look forward with great interest to the perfection of the process, for in addition to any aid that a trustworthy system of spectroscopic analysis will give to assaying operations, I have hope of deriving great assistance from it in our melting and refining operations. In conducting the Bessemer steel process, the spectroscope has been of great service, of late it has been much used in Germany, and it appears probable that it may prove to be in some degree useful in the operations I have noted.

In Electricity, only a few revivals and new applications have been made.

Foremost is the revival of Duplex Telegraphy, *i. e.* the method of sending messages simultaneously along the same wire in opposite directions. To Mr. Stearns, an American telegraph-engineer, it is due that this important subject was prominently brought up again by his having actually succeeded in introducing practically the long and well known methods of Duplex Telegraphy on some of the American telegraph lines. His success is due to the introduction of condensers for the purpose of balancing the charge and discharge of the line. Certain experiments were tried on the Indian lines in November last year: the experiments which were made between Allahabad—Calcutta and Allahabad—Jabalpur during October and November, were very successful and showed the entire practicability of Duplex working. At present arrangements are being made to finally introduce the system on one of the important main lines between Calcutta and Bombay.

The first and great requirement in connection with Duplex Telegraphy is a general mathematical investigation to decide on the best method available, and for this method to calculate the best resistance arrangements and distribution of condensers, required for any given line, overland or submarine; for the results of such an investigation would be a guide for practical telegraph-engineers to start Duplex working under the most favourable circumstances and a paper on this subject, *viz.*, on the general and particular laws which regulate Duplex Telegraphy was yesterday read by Mr. Schwendler to the Physical Science Committee.

Referring to the Electro-Telegraphic determination of the differences of Longitude on parallel 13° and in which I have already brought to your notice



the difficulty of placing the telegraph line at the disposal of the observers, it will be obvious how much the introduction of the method of Duplex Telegraphy, would facilitate such operations and how important it is that such facilities should exist.

Another great improvement in the application of electricity is represented by the magneto-electric machine of Gramme, which is based on the principle of Siemens, Wheatstone and Wilde, to accumulate electricity by the transformation of mechanical force into magnetism and electricity. The new features in this machine are the better coiling of the revolving wire and an improved construction of the commutators by which the extra currents are partly eliminated and the total effect of the machine greatly increased.

The effect of this machine was tried in London last summer for producing marine signal lights from the top of the Houses of Parliament. The best optical instruments aided the trial and the success was very great and the light brilliant.

This cheap mode of producing enormous quantities of electricity has further suggested more extended applications of the electric current in other engineering branches and it is not improbable that metallurgy will receive much aid from it in the production of pure metals.

Before leaving this branch I would ask your attention to the question of Earth Currents. The subject is referred to by Mr. Schwendler in the second part of his instructions for testing telegraph lines.

Earth Currents. These are caused by a difference of potentials between the two points of the earth with which the earth plates are in contact. To measure these currents and to determine their directions and the electromotive force producing them, is of the greatest scientific interest.

The phenomenon of earth currents is generally, however, much obscured by various causes, especially the polarization of earth plates, and by other causes of which we shall speak hereafter. All that we can do is to measure the total effect of all the causes acting, and only rarely are we able to attribute to each cause its proper effect. Still we are able to say from four years' experience of testing Indian lines, that real earth currents do permanently exist, although we have not been able to estimate the electromotive force or to determine the law of change in direction in each particular case.

To be in a position to do this, special observations would be necessary.

Further: Earth Currents attain their maximum strength when those "magnetic storms," occur which seem to accompany all great perturbations of the sun's surface, and are generally marked by the appearance of vivid Auroras. During such periods, as in the autumn of 1849-50 and 1870, communication is rendered impossible except in cases when the earth can be thrown off and a second wire used for the return circuit.



Looking then to the conditions with which the question is surrounded and to the vast country we live in, it is evident that there is no country that offers so large a field and such facilities for observation as does India. In the first place in no country in the world is there so large and so complete a Telegraphic system under one administration, in no country in the world are the electrical conditions so good as they are for several months of the year in the drier climates of India, nor is there any Telegraph system that can compete with that of India in the excellence of its mechanical and electrical conditions.

The expense of making observations would be trifling, and Colonel Robinson, the Director-General of Telegraphs, is fully alive to the importance of the question and is anxious to see the observations carried out.

Looking then to these circumstances I think it becomes the duty of the Society to urge on the attention of the Government, the desirability of carrying on a complete system of observing earth currents in the Telegraph Department and I would recommend that the Physical Science Committee of this Society consider the question.

The Society are aware that a scheme for somewhat supplementing the work begun in the "Porcupine" and now being carried on by the "Challenger," was proposed for dredging in the Indian Seas. The Government of India supported the scheme, and the Secretary of State sanctioned the purchase and sending to India of certain appliances selected under the advice of the Royal Society. Some of these have arrived, and I am informed that others are being procured. The progress, however, has been lamentably slow and until all appliances are received, nothing can be done.

The scheme which was heartily supported by the late Commander-in-Chief, Admiral Cockburn, was, that if such appliances as would be necessary, were prepared, the Commander-in-Chief, whenever the exigencies of the service permitted, and which he thought would be frequent, would order one or more of the smaller vessels of the station for the work.

The Society recommended that a Committee should be formed to direct the operations under these arrangements, but owing partly to the lamented death of Admiral Cockburn, and partly to the non-arrival of the apparatus, no Committee has ever been formed.

At present nothing can be done in dredging, for I feel sure that our Society would not, in the present unfortunate state of part of the country, wish that Government should incur the slightest avoidable expenditure, but I do think that the Committee should be formed to give the work an existence, the function of the Committee being simply to get, as may be possible, all in readiness so as to take advantage of the first opportunity of any available vessel that might offer, instead of running the risk of losing an opportunity, however small, through want of preparation.



During the past year, the question of establishing a Zoological Garden has been brought before the Council of the Society, by Mr. Schwendler. The question had previously been frequently considered, but from the difficulties of procuring funds and a site, it had never as yet been found possible to carry out any proposal. The Society, however, took up Mr. Schwendler's scheme warily and called a meeting of all those residents of Calcutta who were considered likely to advance the project. The Agri-Horticultural Society joined and a deputation waited on the Lieutenant-Governor of Bengal, but still the want of funds and of a site, stopped all proceedings and the question now rests thus. If the Town or any other Body or Society can supply a site, there is every probability of a Zoological Society being formed, which the Asiatic Society would support as far as lay in its power. The question is important. The Zoological Societies of Europe look anxiously for the maturing of the scheme, and this has been forcibly expressed by Dr. Bodinus, Director of the Zoological Garden, Berlin, in a letter to Mr. Schwendler.

It is considered that India offers the greatest facilities, not only for establishing a local collection for promoting the study of Zoology locally, but that it offers facilities for giving the greatest assistance to all the Zoological Societies throughout Europe and that a Society in Calcutta would thus have a far more extended sphere of useful action than any other Zoological Society could hope for.

Considering the influence and power of assisting that such an institution would have, it certainly seems incumbent on the Asiatic Society to support the scheme to its utmost, and hence I trust that as soon as the condition of the country admits of it, we shall be able to proceed in the matter.

Of the labours of the Geological Survey Department, I must advert to its contributions to the Vienna Exhibition which have met with most marked recognition, and especially for its excellent collection of Salt, Iron and Coal there exhibited, and which latter have demanded the greatest attention from all interested in the question of mineral fuels.

A Diploma of Honor was awarded to Dr. Oldham for the high interest attaching to the collections contributed by the Geological Survey of India.

This year has seen the completion in the *Palæontologica Indica* of the great work upon the Cretaceous Fauna of Southern India, forming four large quarto volumes. The plates are admirably executed, while the range and precision of Dr. Stoliczka's labours give to this work a prominent place in Palæontological literature.

The most noteworthy facts of the year in Indian Geology are : first, the discovery by Mr. King in the lower Godáviri valley, of a zone containing marine fossils among the upper members of the great stratigraphical series



to which our coal measures belong. Some light may thus be shed upon the obscure homotaxy of these interesting formations. Secondly, the late discovery of a seam of Anthracite Coal by Mr. Mallet of the Geological Survey which has an amount of unusual interest; first because it is the result of a search undertaken on theoretical grounds, and secondly because it promises to throw some additional light on the geological structure of the Himalayas. In 1849 Dr. Hooker found in a little stream leading from the Pankabarry Bungalow, some specimens of *Vertibraria* and *Trizygia* which are well known fossils of the Damúdah coal-fields. At this place the stream cuts its way through beds of sandstone which in some places contain bands of lignite and belong to the Sub-Himalayan Tertiary Rocks. Dr. Hooker appears to have inferred that these beds were older than those yielding the fossils, since they appeared to dip under them. Dr. Hooker's error was corrected in 1856 by Mr. W. T. Blanford who found that at the very head of the little stream in question, the Tertiary sandstones rested against a graphitic band from which the Damúdah plants had clearly been derived, and which is quite independent of the Tertiary rocks and very much more ancient. This investigation being made in the height of the rains, and the locality being an unhealthy Terai, the bed could not be then traced up, and it was not until the present season, that Mr. Mallet was sent to follow up the discovery.

You know what great attention the Coal question is now demanding in England, in instance of its importance I may mention that one of the greatest authorities on the subject, Dr. Siemens, stated in a lecture delivered at Newcastle on behalf of the British Association, in September last, "that from the simple rise in price of 8 shillings per ton during the year 1872, the British consumer of coal had to pay £44,000,000 more than the market value of former years for the supply of his coal; the consumption in Great Britain was 110,000,000 tons per annum."

He estimates the consumption of fuel is so wasteful, that if it was used in a careful and scientific manner, the consumption could be reduced by half, and he further estimates that in the production of iron and steel and in steam power, the aid that science gives towards improvement and economy effects already an actual annual saving in expenditure of full 4 per cent. additional every year.

The question of mineral fuel equally demands our attention in this country. Hitherto Indian coal has not been used either for metallurgical purposes or to any extent for ocean-going steamers, so that there has been a considerable importation of English coal and coke.

For the removal of difficulties in the former case, I have taken the first step by the introduction of Siemen's Gas Furnaces in which coal from the Bauegunge field, is now used for metallurgical purposes, and for which English fuel was formerly imported.



The introduction of these furnaces has been, as may easily be conceived, a work of considerable difficulty, but they are now perfectly successful and are worked with an ease scarcely hoped for some time since.

I look to this as a very great step made in the Coal question of India, both in respect to its application and to its economy; for where distances are so great, economy in working means extending the area over which coal is available.

As to the second question, I have for a long time been employed on a very extensive series of Coal Trials, the results of which I hope to be able soon to make public, when it will be found that the duty done by many of the coals from the Ranegunge field comes near to that done by English coal and gives hope that ere long Indian coal will take a better place among mineral fuels.

You are also aware the Secretary of State sent out early in the year Mr. Bauerman to report upon the Iron and Coal-fields of India with a view to the manufacture of Iron in this country.

Mr. Bauerman's preliminary report has been sent in and the Laboratory Department, Geological Survey, is now actively employed on the necessary analysis of Ores and Coals and Limestone for the final report which it is to be hoped will be published at an early date.

In Meteorology, some progress has been made in Bengal in discerning the causes and courses of the Indian Monsoons. But it is not possible to complete this work, nor indeed to gain any satisfactory acquaintance with Indian Meteorology so long as no information can be obtained from the Punjab, Bombay and Madras.

A very extensive system of Weather-Telegraphy has just been established in the China Seas under the control of the Inspector-General of Customs and it is intended to extend it from Possiet in the Russian Territories in the North to Batavia in the South, with a view to warning all parts of the coast of the approaching storms. Stations for observing and telegraphing the weather are established on several parts of the Coast, and in Japan, the Phillipines, &c., and then there will be three stations in the interior, viz., Peking, Hongkong and Kinkiang.

With the example of China and those seas before us, I do think that the question is one that demands the attention of our Society. The Government of India are liberal in their provision of instruments, but I fear that throughout the greater part of the country, the liberality is wasted.

The necessity for taking and recording observations seems to be acknowledged, but there is a want of some carefully drawn out scheme. At present the instruments are distributed to those who cannot possibly devote sufficient time either to learning how to use the instruments or to use them, and yet this should not be. For when there are distributed over



India, such a vast number of European troops, one of whose difficulties is, want of occupation, surely there will be found men in sufficient quantities fit and willing for the work.

If you look back through our records, you will find that whenever suggestions have emanated from this Society, the Government of India have always given that attention they deserve, and have always cordially accepted any practical scheme.

All scientific men throughout the world have pointed to India as the fittest field for Meteorological observations, and they all agree that India can do more towards solving Meteorological problems than can any other country. With this before us, and with the knowledge that the Government spends sufficient money, which if only properly directed, would do much of what is required, it is a reflection on us, that this great Empire has done so little, and I think it is the duty of the Society to move in the matter.

In 1869, this Society took up the question of teaching Physical Science to the people of this country. At the close of the previous year, our President, Dr. Fayrer, brought to your notice the serious discouragement that the study of Physical Science had met with in this country and Dr. Oldham on succeeding to the chair followed up the question. The Council addressed His Excellency the Governor General as Patron of our Society and as Chancellor of the University, and urged the addition of an elementary knowledge of Natural and Physical Science to the course required from every candidate for matriculation in the University of Calcutta. The teaching of Physical Science has always been considered by this Society as of the utmost importance. It must then be to us a subject of congratulation that His Honor the Lieut.-Governor of Bengal has this year taken the practical step of teaching what must be held to be the most necessary branch by appointing a professor of Chemistry at the Presidency College.

Mr. Pedler is the first professional chemist that has been appointed to teach this all important science in Bengal, and a laboratory is being erected by the order of the Lieut.-Governor, in which it will for the first time be possible to teach practical chemistry. With this before us, and seeing the practical turn that the Government of Bengal has of late given to education, there is some hope that we are tending towards educating the people more thoroughly, and that we have taken the first step towards leading them, as Dr. Fayrer rightly said, from lowest to highest truths, by instructing them in the subjects included under the comprehensive term 'Physical Science' and by imbuing them with a comprehension of those general laws by which all physical phenomena are regulated.

Gentlemen, there is much to be said on these subjects, but time will not permit more. I fear I have already trespassed too much on your patience, and I must leave what I leave to say to some other opportunity.



Colonel Thuillier said, he thought the meeting would agree with him in saying that their worthy President was entitled to their best thanks for the interesting address he had just delivered, and also to the thanks of the Society at large for his care and attention to the various duties of his office during the past year. He had no doubt, the same regard for the interests of the Society, would be continued during the current year under Col. Hyde's presidency. The thanks of the Society were equally due to the several Secretaries and Office-Bearers for their unremitting attention to their duties.

Messrs. F. W. Peterson and A. Pedler were elected to audit the accounts for 1873.

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The Meeting was then resolved into an ordinary Monthly General Meeting.

Col. Hyde, R. E., President, in the chair.

The minutes of the last meeting were read and confirmed.

Presentations were announced—

1. From the Royal Herbarium at Leyden, a copy of "*Illustrations de la Flore de l' Archipel Indien.*" Livr. 1-3. By F. A. W. Miquel.

A copy of "*Musée Botanique de Leide*" Livr. 1-3. By W. F. R. Suringar.

2. From the Author, a copy of a work entitled "*Microscopic examinations of Air.*" By D. D. Cunningham, Esq. M. B.

3. From the Author, a copy of work entitled "*Bhagavat-Gita and the Bible.*" By Prananatha Pandit, B. A.

4. From the Superintendent, Great Trigonometrical Survey of India, Dehra Dún, two copies of "*General Report on the operations of the Great Trigonometrical Survey of India during the year 1872-73.*"

5. From the Author, a copy of "*Observations of the Filtration of the Hughli water for the Calcutta Water-supply.*" By D. Waldie, F. C. S.

The following gentleman, duly proposed and seconded at the last meeting, was balloted for and elected an Ordinary Member.

Dr. C. J. Jackson.

Mr. Jules Schaumburg proposed at the last meeting by the Council, was balloted for and elected an Associate Member of the Society.

The following are candidates for ballot at the next meeting—

A. C. Lyall, Esq. C. S., proposed by Col. H. L. Thuillier, C. S. I., seconded by A. O. Hume, Esq., C. B.

A. Crombie Esq., M. D., Medical College Hospital, proposed by Dr. S. B. Partridge, seconded by Capt. Waterhouse.



R. Brown, Esq., M. D., F. R. C. S., Political Agent, Manipur, proposed by Dr. J. M. Foster, seconded by Mr. H. Blochmann.

C. H. Wood, Esq., Government Quinologist, proposed by Dr. G. King, seconded by Capt. Waterhouse.

Commander A. D. Taylor, late Indian Navy, proposed by Col. H. L. Thuillier, C. S. I., seconded by Capt. Waterhouse.

J. H. Haworth, Esq., proposed by S. H. Robinson, Esq., seconded by Dr. Waldie.

The following letter from Mr. E. V. Westmacott was read—

*Calcutta, January 25th, 1874.*

MY DEAR MR. BLOCHMANN,—‘I have been reading with much interest your paper on Bengal Geography. Will you allow me to offer a few remarks upon it?’

‘I think if you compare the *Riyáz us saláṭīn* with Dr. Buchanan’s note on the Muhammadan Kings of Bengal, in his report on Dínájpúr, you will agree with me in believing both to have been taken from the same authority, and that, Buchanan says, was a manuscript he found at Poroowa, [Panḍuah] close to Mr. Udney’s residence, and likely to have been used by his protégée who wrote the *Riyáz us saláṭīn*. I have spoken with people who have seen this manuscript, and believe it to have been a contemporaneous record of burials, kept up at Poroowa, with historical notes, ever since the days of the saint Quṭb Sháh (A. D. 1440). I have tried to get a sight of this MS. with a view to publication, but the *mutawallis* tell me it was taken away by one of the Collectors of Púrniah.

‘The country Barendra I identify with the name ‘Borind,’ no longer applied to the whole country once called Barendra, but to the high ground on the frontiers of Dínájpúr, Rájsháhí, and Máldah. The name is commonly used.

‘Ekdála\* I have not yet identified. I cannot accept Mr. Edward Thomas’ suggestion of Jogodol, of which the last o is pronounced not like o in doll, but o in dole. There is a place called Chaudála east of Poroowa. I do not know Dodalá; from the spelling I should expect to find the a in *dál* long, as it is pronounced in Chaudála. From the description of Ekdala, as situated in an inundated country, I think it may have disappeared in some change in the course of one of the rivers, perhaps of the Mahánandá, which flows a very little way to the westward of Poroowa.

‘The native name of Sylhet is Sreehotto to this day.

‘The word Koch is always pronounced with a nasal sound in Dínájpúr, but this is not the case in the form *Koshyo*.

\* For Mr. Westmacott’s identification of Ekdálah *vide* April’s Proceedings of this year. THE EDITOR.



Catalogue of the Specimens of Hemiptera Heteroptera in the Collection of the British Museum, Part VIII, by F. Walker.

THE TRUSTEES OF THE BRITISH MUSEUM.

Journal Asiatique, No. 6, Août-Septembre, 1873.

*M. Senart*—Essai sur la légende du Buddha, son caractère et ses origines.

THE ASIATIC SOCIETY OF PARIS.

Bulletin de la Société de Géographie, Novembre, 1873.

*Ali Suavi*—A propos de la mer d'Aral.

THE GEOGRAPHICAL SOCIETY OF PARIS.

Actes de la Société Linnéenne de Bordeaux, Tome VIII, Part 2nd.

THE LINNEAN SOCIETY OF BORDEAUX.

Zeitschrift der Deutschen Morgenländischen Gesellschaft, Bd. XXVII, Heft I.-II.

*Th. Aufrecht*—Ueber die Paddhati von Cāṛṣṭagadhara.

THE GERMAN ORIENTAL SOCIETY, LEIPSIG.

Musée Botanique de Leide, par W. F. R. Suringar, Vol. I, Livr 1-3.

Illustrations de la Flore de l'Archipel Indien, par F. A. W. Miquel, Tome 1er, Liv. 1-3.

THE ROYAL HERBARIUM AT LEYDEN.

General Report on the Operations of the Great Trigonometrical Survey of India during 1872-73, by Col. J. T. Walker, F. R. S.

THE SUPERINTENDENT OF THE G. T. SURVEY.

Review by the Chief Commissioner on Arboricultural operations in the Central Provinces for 1871-73.

The Central Provinces' Census, 1872.

THE CHIEF COMMISSIONER OF THE CENTRAL PROVINCES.

Voyage on the Euphrates from Suklewieh to Muskeneh.

THE GOVERNMENT OF INDIA, FOREIGN DEPARTMENT.

Extracts from the Reports of the Trigonometrical, Topographical, and Revenue Surveys of India for 1871-72.

THE GOVERNMENT OF INDIA, A. R. C. DEPARTMENT.

Report on the Land Revenue Administration of the Lower Provinces for 1872-73.

Report on Vaccination in the province of Bengal, 1872-73, by Surgeon General J. C. Brown.

THE GOVERNMENT OF BENGAL.

The Bhagavat-gîtâ and the Bible, by Pranânâtha Pandita, B. A.

THE AUTHOR.

Results of Meteorological Observations made at Daba Gardens, Vizagapatam, by A. V. Nursingrow.

THE AUTHOR.

Morte de Yagindatta, episodio do Poema Epico-o Ramayana versos Portuguezes de candido de Figueiredo.

THE AUTHOR.



Observations on the Filtration of the Húgli Water for the Calcutta Water-Supply, by D. Waldie.

THE AUTHOR.

Microscopic Examinations of Air, by D. D. Cunningham, M. B.

THE AUTHOR.

The Christian Spectator, Vol. III, No. 31.

THE EDITOR.

The Calcutta Journal of Medicine, October, 1873.

THE EDITOR.

Pratna-Kamra-Nandini, Vol. VI, No. 1.

THE EDITOR.

Indische Studien, Bd. XIII.

THE EDITOR.

Journal des Museum Godeffroy, Heft 3. Andrew Garrett's Fische der Südsee, von. A. C. L. G. Günther, Heft I.

H. F. BLANFORD, ESQ.

#### *Purchase.*

London, Edinburgh and Dublin Philosophical Magazine, November, 1873.

*Professor O. Reynolds*—On the action of a Blast of Sand in Cutting Hard Materials. *F. Löflner*—On the Temperature and Physical Constitution of the Sun. *J. D. Dana*—On some results of the Earth's Contraction from cooling, including a discussion on the Origin of Mountains.

The Annals and Magazine of Natural History, November, 1873.

*H. J. Carter*—On the Hexactinellidæ and Lithistidæ generally and particularly on the Aphrocallistidæ, Aulodictyon and Farrea, together with facts elicited from their deciduous structures and descriptions respectively of three new species. *R. Swinhoe*—On three species of birds from Chefoo (N. China). *Dr. A. Günther*—On a collection of Fishes from Chefoo (N. China). *H. W. Bates*—On the longicorn Coleoptera of Japan. *Dr. C. F. Lütken*—On spontaneous division in the Echinodermata and other Radiata.

The Ibis, October, 1873.

*R. Swinhoe*—Notes on Chinese Ornithology. *Capt. J. Hayes Lloyd*—On the Birds of the province of Kattywar in Western India.

The American Journal of Science, October, 1873.

*Eng. W. Hilgard*—On the Silt Analysis of Soils and Clays.

Revue et Magasin de Zoologie, Nos. 10-11, 1873.

Revue des Deux Mondes, 15th Oct. to 15 Nov., 1873.

Revue Archéologique, Octobre, 1873.

Journal des Savants, Octobre, 1873.

Comptes Rendus, Nos. 14-19, 1873.

No. 14. *M. L. Respighi*—Deuxième note sur la grandeur et les variations du diamètre solaire. *M. Gimbert*—Assainissement des terrains marécageux par l' *Eucalyptus globulus*.



No. 15. *M. C. Davaine*—Recherches relatives à l'action des substances dites *antiseptiques* sur le virus charbonneux. *M. H. Caron*—Note sur un nouveau mode de trempe de l'acier. Régénération du fer brûlé.

No. 18. *M. Th. du Moncel*—Note sur les meilleures dimensions à donner aux électro-aimants. *M. F. G. Calvert*—De l'influence qu'exercent certains gaz sur la conservation des œufs.

No. 19. *M. Dumas*—Note sur l'action que le plomb exerce sur l'eau. *M. Ferd. de Lesseps*—Extrait d'une lettre à Lord Granville sur le projet d'un chemin de fer dans l'Asie Centrale. *M. L. Colin*—Influence de l'eau employée en boisson sur la propagation du choléra. *M. Fordos*.—Action de l'eau aérée sur le plomb, considérée au point de vue de l'hygiène et de la médecine légale, *M. H. Tarry*—Procédé pour déterminer la direction et la force du vent; suppression des girouettes; application aux cyclones.

Reeve's Conchologia Iconica, Parts 306-307. *Helicina. Scalaria. Emarginula. Plicatula. Conathodon.*

Le Calendrier de Cordoue de l'année 961,—Texte Arabe et ancienne traduction Latine, publié par R. Dozy.

Die ehemalige Spracheinheit der Indogermanen Europas,—Eine sprachgeschichtliche Untersuchung von August Fick.

Studien über Indogermanisch-semitische Wurzelverwandtschaft, von F. Delitzsch.

Wörterbuch zum Rig-Veda, von H. Grassmann, erste Lieferung.

The Sāmavidhāna Brāhmaṇa, edited by A. C. Burnell, Vol. I.

Five Jātakas, in the Original Pali Text, with a Translation and Notes, by V. Fausbøll.

Apastambīya Dhurma Sūtram, edited, with a Translation and Notes, by G. Bühler, Part I, containing the Text with critical Notes, and an Index of the Sūtras.

Lectures on Light, by J. Tyndall, LL. D., F. R. S.

Heat, a Mode of Motion, by J. Tyndall.

Lectures on Sound, by J. Tyndall.

The Genesis of Species, by St. George Mivart.

The Descent of Man, and Selection in relation to Sex, by Charles Darwin, M. A., F. R. S.

The Expression of the Emotions in Man and Animals, by Charles Darwin.

The Beginnings of Life, by H. C. Bastian, M. D., F. R. S.

The Depths of the Sea, by Prof. C. Wyville Thomson.

Pre-Historic Times, as illustrated by Ancient Remains, and the Manners and Customs of Modern Savages, by Sir J. Lubbock, Bart.

Popular Lectures on Scientific Subjects, by H. Helmholtz.

Quarterly Journal of Microscopical Science, Vol. XIII.

A Comparative Grammar of the Modern Aryan Languages of India, by J. Beames, B. C. S., Vol. 1., on Sounds.



Rude Stone Monuments in all Countries, their Age and Uses, by James Fergusson, D. C. L., F. R. S.

History of the Imáms and Sayyids of 'Omán, by Salil-ibn-Razik, from A. D. 661-1856, translated and edited by the Rev. G. P. Badger.

A General System of Botany, Descriptive and Analytical, by Emm. le Maout and J. Decaisne.

The Universe, or the Infinitely Great and the Infinitely Little, by F. A. Pouchet.

Physical Geography of the Globe, by Sir John F. W. Herschel, Bart.

A Reading Book of the Turkish Language, with Grammar, and Vocabulary, by W. B. Barker.

Etymologische Forschungen auf dem Gebiete der Indo-Germanischen Sprachen, von Professor Dr. Aug. F. Pott,—Wurzel-Wörterbuch der Indo-Germanischen Sprachen, Band IV and V.

Erânische Alterthumskunde, von F. Spiegel, Band 2. (Religion. Geschichte bis zum tode Alexanders des Grossen).

Vergleichende Grammatik der Indo-Germanischen Sprachen von R. Westphal, Th. I. (Das Indo-Germanische Verbum nebst einer Uebersicht der einzelnen Indo-Germanischen Sprachen und ihrer Laut.-verhältnisse).

Indische Alterthumskunde, von C. Lassen, Band 2. (Geschichte von Buddha bis zu dem Ende der älteren Gupta-Dynastie. Nebst Umriss der kulturgeschichte dieses Zeitraums.)

Les Migrations des Peuples et particulièrement celles des Touraniens, par Ch. E. de Ujfalvy de Mezo-Kövesd.

A Dictionary of the English and Malabar Languages.

A Grammar of the Thai or Siamese Language, by Capt. J. Low.

Fauna Boreali-Americana, by J. Richardson.

Plantæ Javanicæ rariores, by T. Horsfield.

M. Milne Edward's Manual of Zoology, translated by Knox.

Schreder's Turkish Grammar.

Index to Vols. 1—50 of the Calcutta Review, by J. Furrell.

Indian Polity, a view of the System of Administration in India, by Lieut.-Col. George Chesney, R. E.

Haydn's Dictionary of Dates.

McCulloch's Geographical Dictionary, 2 vols.

#### *Exchange.*

Ocean Highways, No. 9, December 1873.

Nature, Nos. 215-218.

#### *List of Sanskrit and other Manuscripts and lithographed works purchased for the Society.*

1522. Pas'ubandha.

1523. Mahābhārata-tātparyya-nirṇaya.



1524. { Púrva-mímánsártha-sangraha  
or Laugákshi, by Laugákshi Bháskara.
1525. Akshara-chintámaṇi, by S'iva.
1526. Sávitra-chayana-prayoga.
1527. S'ruti-lakshana-práyas'chitta.
1528. Kalpasára-káriká.
1529. S'as'isaná-kávya, by Jagannátha Paṇḍita.
1530. Sañhitopanishad-vivarana, by Sañkarácharya.
1531. Muhúrta-chintámaṇi Tiká, by Nilakantha and Govindaji.
1532. Kumáratiká, Bila-bodhini, by Navanítarāma.
1533. Sārasvat Stotra.
1534. Akshara-chintámaṇi, by S'iva.
1535. Bhagavadgítá, Maháráshtri.
1536. S'raddha-paddhati, by Raghunátha.
1537. Anandavinoda, by Kámarāja Dikshita.
1538. Bhrigu-sañhitá.
1539. Savana-prayoga.
1540. Vyákhyásudhá, Commentary on Amarakosha, by Bháú Dikshita.
1541. Padma-purána, Patálakhaṇḍa, by Vyása.
1542. Bhuvanes'vari-rahasya.
1543. Gaṇes'a-gítá.
1544. Káli-stava-tíká.
1545. Gaṇapati-s'ukta.
1546. Ratnamála, by S'rípati.
1547. Mahishotsarga-vidhi.
1548. Grihyágni-sāra, by Náráyana Bhaṭṭa Arada.
1549. S'raddha-prayoga.
1550. Kálabhairava-sahasranāma.
1551. Mahákála-sañhitá.
1552. Bálavidha, by Budha Mis'ra.
1553. S'iva-sañhitá.
1554. Nara-lakshana-s'āstra, by Durlabharāja.
1555. Prákrit Grammar, by Márkaṇḍeya.
1556. Kalki-Purāṇa.
1557. Gopála-lilá-kávya, by Rámachandra Bhaṭṭa.
1558. Trikoṇamiti-tantra, by Bápu Deva.
1559. Vártika-páṭha, by Govardhana Mis'ra.
1560. Aushadha-námavalí.
1561. Vehulá-Nakindara, by Nilámbara S'armá.
1562. Golá-prakás'a.
1563. Unádi-vritti, by Ujvala Datta.
1564. Yoga-chintámaṇi, by S'rīharsha Kírṭi S'uri.



1565. Pañcha-bhūta-vádārtha, by Viṭṭhala S'āstrī.
1566. Khaṇḍana-pariśiṣṭa, by Tārācharana Tarkaratna.
1567. Kalpa-latā.
1568. S'rāddha-viveka, by Pindadhara.
1569. Achārādars'a, by S'rīdatta.
1570. Vaidya-jivana-chikitsā saṭika, by Lolimbarāja.
1571. Prāyaschitta-kadamba-nirṇaya, by Gopālā Nyāyapañichānana.
1572. Garuḍa Purāṇa.
1573. Jātakāṅkara saṭika, by Gaṇeś'a Surī.
1574. Hāyana-ratna, by Balabhadra.
1575. Purushottama-māhātmya, a part of the Virhannārādiya Purāṇa.
1576. Pratishṭhā mayūkha, by Nilakanṭha.
1577. Vāda-sudhākara, by Kṛishṇa Achārya.
1578. Vaiyākaraṇa-siddhānta-manjushā, by Nāges'a.
1579. Rasamanjarī (Saṭika), by Bhānu Datta.
1580. S'aktivāda Ṭikā, by Gadādhara.
1581. Jātakābharana, by Daivajña Dhundirāja.
1582. Kuvalayananda, by Appya Dikshita.
1583. Mantra-kaumudī, by Mahidhara.
1584. Praudhamanoramā, by Bhaṭṭoji Dikshita.
1585. Bhāsvatī Saṭika, by Mādhava Miś'ra.
1586. Ramalāmṛita.
1587. Vedastuti Saṭika, by Kās'īnātha Upādhyāya.
1588. S'ānti-mayūkha, by Nilkanṭha.
1589. Navaratna, (Astronomy), by Parama Sukha.
1590. Vrata-rāja, by Daivajña S'armā.
1591. Sarvārtha-chintāmaṇi (Astronomy.)
1592. Uttarāvalī or Uttara pakshāvalī, by Praudha Paṇḍita.
1593. Purva-pakshāvalī, by Praudha Paṇḍita.
1594. Vyutpatti-vāda, by Gadādhara Bhaṭṭāchārya.
1595. Muhūrta-chintāmaṇi-saṭika, by Rāma Daivajña.
1596. Champu-bhārata, by Ananta Bhaṭṭa.
1597. Mahābhāshya, by Patanjali (Lithograph.)
1598. Pratishṭhā-mayūkha, by Nilkanṭha.
1599. Yātaka-paddhati or Praudhamanoramā, by Kes'ava.
1600. Nrisiṅha champu, by Bhaṭṭa Kes'ava.
1601. Sabdendu-s'ekhara-ṭikā, by Sadās'iva Bhaṭṭa.
1602. Alaṅkāra-s'ekhara, by Kes'ava Miś'ra.
1603. Sāhityasāra saṭika, by Achyuta S'armā, Commentary by Nārēyana S'armā.
1604. Viś'va-karma-prakās'a.
1605. Laghu-sabdendu-s'ekhara, by Nāges'a Bhaṭṭa.



1606. Sarvārtha-chintāmani, by Vyankaṭa Śarmā.
  1607. Śūdra-kamalākara, or Ś'ūdra-dharma-tattva, by Kamalākara Bhaṭṭa.
  1608. Prāyas'chittendus'ekhara, by Kās'ínātha Upādhyāya.
  1609. Brihat-pārās'ara-smṛiti, by Parāsara.
  1610. Brihaj-jātaka-saṭika, by Bhaṭṭotpala.
  1611. Achārārka, by Divākara Bhaṭṭa.
  1612. Sañskāra-kaustubha, by Annanta Deva.
  1613. Brahmottarakhaṇḍa.
  1614. Vihāri-s'atsai, by Vihārilāla (lithograph.)
  1615. Dharma-sindhu-sāra, by Kāsínātha Upādhyāya.
  1616. Siddhānta-kaumudī, with the commentary called Tattvabodhinī, by Jñānendra Sarasvatī.
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PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR MARCH, 1874.

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The monthly general meeting of the Asiatic Society of Bengal was held on Wednesday, the 4th instant, at 9 o'clock P. M.

Col. H. Hyde, R. E., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table—

1. From W. F. Blanford, Esq., *Journal des Museum Godeffroy*, Part III, containing A. Garrett's *South Sea Fishes*, Part I, edited by Dr. A. C. Günther.

2. From His Highness the Mahárájá of Bardwán, a copy of the *Mahábhárata*, *Salya*, *Souptika* or *Striparvas*, in Bengali and Sanskrit.

3. From the Author, a copy of a *Vocabulary of dialects spoken in the Nicobar and Andaman Isles*, by Fr. Ad. de Röepstorff.

The following gentlemen duly proposed and seconded at the last Meeting were balloted for and elected Ordinary Members—

A. C. Lyall, Esq., C. S.

A. Crombie, Esq., M. D.

R. Brown, Esq., M. D.

C. A. Wood, Esq.

Commander A. D. Taylor.

J. H. Haworth, Esq.

The following are candidates for ballot at the next meeting—

W. D. Bruce, Esq., C. E., Calcutta, proposed by Captain J. Waterhouse, seconded by Col. H. Hyde, R. E.

James Kimber, Esq., C. E., Midnapúr, proposed by G. Nevill, Esq., seconded by P. Dejours, Esq.

The Council reported that they recommend the Rev. Fr. E. Lafont, S. J., for election as an Associate Member of the Society on the grounds of his well known scientific attainments.



The President reported that the Council have nominated the following gentlemen to serve on the several Committees during the current year—

*Sub-Committee of Finance.*

Bábu Rájendralála Mitra. Dr. S. B. Partridge.  
L. Schwendler, Esq. J. Geoghegan, Esq.

*Library.*

The Hon'ble J. B. Phear. L. Schwendler, Esq.  
Bábu Rájendralála Mitra. J. Geoghegan, Esq.  
The Hon'ble E. C. Bayley, C. S. I. W. S. Atkinson, Esq.  
W. L. Heeley, Esq. Dr. S. B. Partridge.  
G. Nevill, Esq. C. H. Tawney, Esq.  
A. Pedler, Esq. Whitley Stokes, Esq.  
Dr. Mahendralal Sircar. G. W. Barclay, Esq.

*Philology.*

The Hon'ble E. C. Bayley, C. S. I. The Rev. K. M. Banerjea.  
Bábu Rájendralála Mitra. Babu Gour Doss Bysack.  
W. L. Heeley, Esq. Dr. Mahendralal Sircar.  
C. H. Tawney, Esq. Moulavi Abdul Latif Khan Bahadur.  
General A. Cunningham, C. S. I. „ Kabiruddin Ahmad Sahib.  
J. Beames, Esq. Bábu Dijendra Nath Tagore.  
F. S. Growse, Esq. Whitley Stokes, Esq.

*Natural History.*

Dr. J. Ewart. Dr. S. B. Partridge.  
W. S. Atkinson, Esq. L. G. King, Esq., M. D.  
L. Schwendler, Esq. T. R. Lewis, Esq., M. B.  
G. Nevill, Esq. D. D. Cunningham, Esq., M. B.  
H. F. Blanford, Esq. Dr. W. Schlich.  
V. Ball, Esq. W. Theobald, Esq.  
H. B. Medlicott, Esq. W. E. Brooks, Esq.  
D. Waldie, Esq. S. E. Peal, Esq.  
A. O. Hume, Esq., C. B. S. Kurz, Esq.

*Physical Science.*

His Excellency Lord Napier of Magdala. A. Pedler, Esq.  
Col. H. L. Thuillier, C. S. I. R. S. Brough, Esq.  
The Hon'ble J. B. Phear. D. D. Cunningham, Esq., M. B.  
H. B. Medlicott, Esq. T. R. Lewis, Esq., M. B.  
Dr. S. B. Partridge. A. Tween, Esq.  
H. F. Blanford, Esq. W. Theobald, Esq.  
D. Waldie, Esq. W. G. Willson, Esq., B. A.  
L. Schwendler, Esq. A. Cappel, Esq.



*Coins.*

The Hon'ble E. C. Bayley, C. S. I.      Major F. W. Stubbs.  
 Bábu Rájendralála Mitra.              Rev. M. A. Sherring.  
 General A. Cunningham, C. S. I.

*The Committee of Papers.*

The Members of Council.

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Mr. Blochmann exhibited rubbings of the following inscriptions received from Genl. Cunningham and Mr. Delmerick.

*Irich or Erich.*

Irich lies N. E. of Jhánsí, near the right bank of the Betmá, N. W. Provinces.

Parganah Irich is mentioned in the *Áin i Akbari* as the chief parganah of Sirkar Irich, Qúbah Aghrah, and is said to have contained 625,597 *bíg'has*, assessed at 2,922,436 *dáms*. Its inhabitants are *Káyasths*. In the beginning of Sháhjahán's reign, it belonged to Sirkár Islámábád, to which also Bhándér and Panwári belonged. The last two parganahs are counted in the *Áin* to Sirkár Irich.

Irich was in the possession of Bundelá chiefs. In the end of Akbar's reign, Bir Singh Bundelá, Abulfazl's murderer, was besieged in Irich (*Áin* translation, p. 469). In the beginning of Sháhjahán's reign, it was conquered and wrested from Jhujhár Singh, Bir Singh's son; and not long after, it was the scene of one of the last engagements with Khán Jahán Lodí. In 1052 (A. D. 1642), Irich and other places of Sirkár Islámábád were given as *jágir* to Sayyíd Shajá'at Khán, son of S. Jahángír, son of S. Mahmúd Bárha (*Áin* Translation, p. 392). Shajá'at Khán died at Irich in Shawwál of the same year (end of 1642). During the reign of Aurangzib, we find that Mirzá Khán Manúchíhr was Faujdár of Irich; he died in the end of 1083 (beginning of 1673). In 1104 (A. D. 1692-93), Odat Singh, zamíndár of Urchah, is mentioned as Faujdár of Irich.

General Cunningham's rubbing refers to the building of a mosque in Irich, which was completed during the reign of Mahmúd Sháh of Dihlí on the 4th Rajab, 815 A. H., or 10th October, 1412, A. D. The inscription contains a short poem of ten lines (metre, long *ramal*); but three-fourths of left portion of the stone are illegible. The builder of the mosque was Qází Ziyáuddín, apparently a brother of Junaid, the imperial *jágirdár* of Irich.

The following is all that I can decipher; fortunately the date and the name of the king are quite clear.\*

\* The use of *ke* instead of *khi* is archaic. Regarding the form *híçad* for *hashtçad*, vide Proceedings, Decr. 1873, p. 201.



در همایون نوبت فرمانده کشور ستان \* .. .. محمود .. ..  
 آن جهانگیر کے بہر عز اسلام از نیام \* میکشد نیغ .. ..  
 باد یا رب دایما در ملک گیتی ذات شاہ \* چون سکندر کامگار و چون .. ..  
 والیہ اقطاع ایرج خان لشکرکش جنید \* کز علومنزات برچرخ .. ..  
 ہم برادر ہم مدار ملک و ہم دستور شاہ \* ہم پناہ دولت و ہم .. ..  
 نو بنا فرمود این خیبر معظم .. .. \* با چنین گنبد کے در عالم .. ..  
 کرد فرمایش درین قاضی ضیا الدین کے او \* هست خان مملکت .. ..  
 شد بناء چون بود برجہ چہارم از رجب \* سال ہیکصد پانزدہ از ہجرت .. ..  
 از برائے نظم این لولو مبارک بندہ \* .. ..  
 .. .. \* .. ..

1. In the auspicious reign of the country-taking ruler,...Mahmūd.....,
2. The taker of worlds, who for the honor of Islām draws the sword from the scabbard.....
3. O Lord, may the qualities of the king endure for ever in the kingdom of the world! May he be successful like Alexander, and.....
4. The possessor of the jāgīr (*aqḍ*) of Irich, the warlike Khān Junaīd, the elevation of whose rank up to the heaven.....
5. The brother as well as the pivot of the kingdom and the vazīr of the Emperor, the refuge of power.....,
6. Ordered this noble religious edifice to be renovated, with a dome which in the world.....
7. The order for it was given by Qāzī Ziyāuddīn, who is a Khān of the kingdom,...
8. The building was (completed) when it was Friday, the 4th Rajab of the year 815 A. H.....
9. For the stringing of this (poetical) pearl the slave Mubārak.....
10. (Illegible).

#### Piparai, near 'I'sa'garh.

The following two inscriptions were found by General Cunningham on an old mosque and on a well at Piparai, near 'I'sa'garh. They refer to the building of mosques during the reign of Mahmūd Shāh Khiljī of Mālwah (A. D. 1435 to 1482). In the well inscription, the Persian is followed by nine lines of Hindī (illegible). Although the inscriptions mention the years 855 and 884, they look as if they had been written at the same time; for not only are the characters the same, but the phrases used in the one occur in the other. The style is very bad; the lines have different metres, and several have no metre at all. The author, indeed, says that he gives as good a specimen of the speech of the learned as he can give; but his rhymes are the only doggerel verses that I have hitherto seen in inscriptions.



1.

بسم الله الرحمن الرحيم

بعهد دولت محمود شه عادل زمان \* مشهور روشن در شجاعت در جهان  
یافت توفیق این مساجد را بنان \* ملک بود دایم کارها یش در امان  
از برای رحمت حق کرده است \* چون بیاباه روز محشر اجر آن  
کارها هم نیک مشروع میکند \* تا در آید فوج احمد در جهان  
بقدر وسع امکان گفته ام \* از کلام فاضلان دادم نشان  
سلیمان کم سخن گفتن چه داند \* مگر می باید قلم راندن دران  
سال هجرت هیصد و پنجاه پنج \* شانزده بد صفر کردم بیان

In the name of God, the merciful and the clement!

1. In the time of the reign of Mahmúd Sháh, the just one of the age, who is well known in the world for his bravery,
2. He (?) found grace to build these mosques. The kingdom will last long, his deeds (are done) in faith.
3. He has done (so) on account of God's mercy, because on the day of resurrection he will find his reward.
4. The deeds he performs are also good and allowed by law, so that the army of the Prophet enters paradise (?).
5. I have spoken according to the breadth of human power, of the speech of the learned I have given a sign.
6. What does Solomon know when he speaks little? He should rather have composed writings.
7. The year of the Hijrah is 855, and it was the 16th Çafar. I have given the explanation. [20th March, 1451.]

2.

بعهد دولت پادشاه محمود نادر زمان \* باد او غازی در شجاعت .. (۹)  
شرفخان بن ملو خان عادل بدوران \* که او .. ..  
ملک سعید شد که دایم کارهایش در ایمان \* یافت توفیق .. ..  
کارها هم نیک صالح میکند \* تا در آید با محمود در جهان  
سال هجرت هیصد و هشتاد چهار \* بیست پنجم ماه شوال روز دوشنبه اتمام او

1. In the time of the reign of Mahmúd Sháh, the distinguished one of the age, .....(unintelligible),
2. Sharaf Khán, son of Mallú Khán, the just one in the time, who.....
3. The kingdom is pleasant, for his deeds are for ever (performed) in the faith; he found grace to build it.
4. The deeds he performs are also good and pious, so that he may go with Muhammad into Paradise.
5. The year of the Hijrah is 884, on Monday the 25th Shawwál it was completed. [9th January, 1480.]

Here follow several illegible lines in Hindí.



## Abu'har and Sirsá'.

Mr. J. G. Delmerick some time ago forwarded to the Society two stones. One was found among the débris of the old fort of Abúhar in the Sirsá District, Dihlí. The inscription is in excellent preservation; it seems to have been put up some time after the erection of the edifice itself, when the exact date of the building had been forgotten. The characters resemble the characters of inscriptions of the Tughluq period.

تجدید عمارت هذه البيت في أيام دولت سلطان السلاطين شمس الدنيا والدين  
التمش السلطان نصير امير المومنين في نوبت ايلة الملك المرحوم قتلغ خان  
ایک فی شهر سنه نیف و ثلثین و ستمایه ۱۱

The renovation of this edifice (took place) during the time of the reign of the king of kings Shamsuddunyá waddín Iltitmiş, the king, the helper of the Commander of the faithful, and in the time of the governorship of the late Qutluğ Khán Aibak. In the year six hundred and thirty-odd. [A. D. 1232-1242.]

The other stone was found in the Fort of Sirsá, and contains a Persian poem of seven lines. The first, fifth, and ninth hemistichs are wanting, one-fourth of the stone on the right hand having been cut off. Though the inscription is incomplete, it is clear that it refers to the erection of a house, built by Muhammad Sháh in 732 A. H., in order to please the spirit of Tughluq Sháh, the martyr, whose death, if we could trust Ibn Baţúţah, he had caused by the breaking down of a state pavilion. That Muhammad Sháh was anxious to appease the manes of his uncle, is also clear from his coins.\*

سلطان بر و بحر محمد شه جهان  
بهر ثبات مملکت این خانه شد تمام \* میمون مبارکست درین منزل این مقام  
تا خود رود بشغله از سمت شهر راه  
روح شهید تغلق شه شاد دل بدین  
اشکار را قدر .. فصیح  
از مال ملک خویش بگردست این بنا \* قصر زبرجدیش بچنه دهد خدا  
تاریخ از جماد الاول نهم بدان \* از سنه هفتصد و سی و دو شد نشان

- 1.....the Sultán of land and sea, M u h a m m a d, the king of kings.
2. For the sake of the stability of the kingdom this house was completed; this place is lucky and auspicious at this stage.
- 3.....in order that he may himself go for some business from the direction...
4. From sincerity to the Khalífah [Tughluq Sháh], he [Muhammad Sháh] shall alight in this place: the spirit of T u g h l u q Sh á h, the martyr, is here happy.

\* Vide Thomas, Chronicles, pp. 212, 213. In the legends of Muhammad Tughluq's coins read *برجسته* *الراجی برحمة* (pp. 209, 213, 214, 216); *reviver*, p. 211; and *برهانه* p. 212.



5. (Broken, and the second hemistich is unintelligible.)
6. He built this edifice from the taxes of his kingdom. God will give him an emerald castle in Paradise.
7. Know that the date is the 9th Jumáda I, 732 [7th February, 1332.]

Col. Hyde exhibited two specimens of iron as remarkable examples of the change that takes place in the structure of wrought iron when submitted to long and continued concussion or strain, and he explained that the first section was one face of the fracture of the piston-rod of a steam-hammer, that had been in use some seven years.

The rod, which was 5" in diameter, broke off suddenly while the hammer was at work. The fracture is sharp and perfectly crystalline in many places exhibiting faces, measuring  $\frac{1}{4}$  of an inch.

The other face of the fracture, which he also placed on the table, had been heated and cut, so as to prepare the rod for the new end to be welded on, and from it would be seen that this operation had, when the hammer had been applied, entirely restored the original structure of the iron.

The second example was a small piece from the fracture of one of the rods of an hydraulic press that had been at work for some 25 years in a bullet machine, and its structure was even more remarkably crystalline than that of the steam-hammer piston.

Col. Hyde remarked that though it was perfectly well known that concussion and vibration produced this change in the structure of iron (a fact of which they had daily experience in the Mint machinery), he was not aware if it was well established, that the same change was produced by the gradual forces at work in iron in the position of a rod in an hydraulic press, and that in the two examples on the table, the same result had been produced in one by repeated and violent concussion end on for some seven years; in the other by repeated but gradual tension end on for some twenty-five years.

Mr. Schwendler remarked that the two pieces of crystallized wrought iron exhibited by the President were most perfect specimens, and added that it would be interesting to know if this crystalline state of the iron supervenes suddenly or is only arrived at gradually, he himself was inclined to believe the former to be the case, since it can scarcely be admitted that there is any intermediate state between the amorphous and the crystalline condition of the same body.

Dr. Waldie could not concur with Mr. Schwendler inasmuch as there were many gradations between the non-crystalline and crystalline states of bodies, and that pieces of wrought iron which had been subjected for different lengths of time to crystallizing influences exhibited different degrees of crystallization.



Mr. Schwendler said that the fact advanced by Dr. Waldie did not contradict his hypothesis, for he did not deny the existence of different states of crystallization of different pieces of iron, but contended that the transition from the amorphous to the crystalline state in any one piece of iron was *per saltum* and permanent in character.

Mr. Schwendler exhibited a crow's nest made with bits of thin telegraph wire, which had been most ingeniously adapted to the purpose. He said that nests of this kind had on several occasions been found on the buildings in, and on the trees near, the Telegraph Store Yard.

So long as the crows used only waste Government material to increase the stability of their nests, and were content to build them on trees and houses, he had not the slightest objection to make; but, when they came to use the Telegraph wires and posts to support these metal structures, their advance in the arts assumed a highly objectionable form from a telegraphic point of view. For such nests would invariably cause what are technically called "earths" and "contacts," and thereby interfere with Telegraph communication. In Calcutta, on the large terminal post near the signal office, nests of this kind had been found, chiefly made with soda-water bottle wire.

On the whole, however, it was satisfactory to see an endeavour on the part of the crows to improve the fabric of their dwellings, and in this respect they might be taken as an example by the majority of natives, who in the construction and arrangement of their houses had not advanced much by the introduction of Western civilization into India, as a single stroll through any of the bazars would shew the observer.

Crows, however, were not, Mr. Schwendler observed, the only animals who, by their domestic or other arrangements, interfered frequently with Telegraph communication. Wasps building their mud nests in the cups of insulators, and birds of prey dropping dead fish, snakes and offal on the wires were all frequent causes of interruption.

In addition to the above, the exposure of overland lines to climatic influences, to atmospheric electricity,\* and to danger during times of war, all pointed to the great advantages that would be derived from the use of under-ground wires, the difficulties to the introduction of which had, he believed, been much exaggerated. To secure regular telegraph communication through all countries in the future, subterraneous lines were required, and when the want had become strongly felt, the technical difficulties (on account of insulation and retardation) would be overcome.

\* On one occasion in Calcutta, 16 insulators were broken by a single flash of lightning.



The following papers were read—

1. *Observations on some Indian and Burmese species of Trionyx.*—By W. THEOBALD, Esq.

My attention having lately been attracted by certain erroneous statements by Dr. J. E. Gray in the Supplement to the Catalogue of Shield Reptiles, dated 1870, and in the Appendix to the same work, dated 1872, and in several papers likewise in those widely circulated works, the *Annals and Magazine of Natural History*, and the *Proceedings of the Zoological Society of London* for the years 1869, 1870, 1871, and 1872, I feel myself reluctantly compelled to come forward with a correction of them, in simple self-justification, no less than in the cause of scientific accuracy and truth, since no one is, in some respects, so well qualified to do so as myself, who collected many of the specimens to which I shall have to refer, and who am therefore in a measure responsible for any glaring error in the recorded distribution or *habitat* of a species, which I knowingly permit to remain uncorrected, when published on my authority. The tone of many of Dr. Gray's remarks is such as to render this a most unwelcome labour, but I shall endeavour to keep as closely as possible to facts which any one can verify, and I confidently appeal to the indulgent consideration of those who, from personal acquaintance, best understand the difficulty which surrounds the subject, and the great disadvantage under which a colonial naturalist writes, who ventures to impugn the *dictum* and scientific utterances of such a veteran savant as Dr. J. E. Gray.

The first point I would direct attention to, as essential to the right comprehension of the synonymy of the group, is the question what *Trionyx hurum*, B. H., really is. Is *hurum* a mere synonym of *Tr. gangeticus*, or is it still available to designate a species hitherto confounded with the last?

In the course of the present paper I shall develop my own views on this point, but first of all I shall advert to the views of Dr. Gray and Dr. Anderson, as recorded so late as 1872.

*Trionyx (Testudo) hurum* is a name applied by Buchanan Hamilton to a Gangetic species, the drawing of which was copied by Gray in his *Illustrations of Indian Zoology* in 1829. The word has no specific application that I can discover, to any one in particular of our Gangetic species, but is merely the ordinary word signifying "forbidden" (as food, that is) to Mahomedans, to whom all turtle are "unclean," and is more familiar to English eyes as *haram*, the "forbidden" apartments of women in the East. In Dr. Gray's Catalogue of Tortoises, Crocodiles, and Amphibians, dated 1844, page 47, and again in his elaborate Catalogue of Shield Reptiles, dated 1855, *Tr. hurum* stands as a synonym of *Tr. gangeticus*, Cuv., and neither in the Supplement to that work, dated 1870, nor the Appendix, dated May 1872, does this same *Hurum* appear as a recognised species. Till the remarkable date then of May 1872, Dr. J. E. Gray must be held to have recognised *Tr. hurum* as a mere synonym of *Tr. gangeticus*, Cuv.



In May 1872, Dr. J. Anderson, Curator of the Imperial Museum at Calcutta, published a brief but very important paper, almost wholly devoted to pointing out the specific distinction between *Tr. hurum*, B. H., and of Gray's Illustrations and *Tr. gangeticus*, Cuv., of which it had hitherto ranked as a synonym. Also that *Tr. ocellatus*, Gray, is a synonym of *Tr. hurum*, B. H. *apud* Anderson, and not of *Tr. gangeticus*, Cuv., as classed by Gray; and that *Tr. javanicus* of Gray's Illustrations is a synonym merely of *Tr. gangeticus*, Cuv.

In the next number of the Annals and Magazine for June 1872, Dr. Gray publishes a criticism of Dr. Anderson's paper, containing the following statement respecting it:—"Here in 1872 we just have what Dr. Buchanan Hamilton did at the end of the eighteenth century, and what I did in the Synopsis of the Reptiles published in 1831." This is so far true that doubtless Buchanan Hamilton considered *Tr. hurum* a good species when he made his drawing, and so may Dr. Gray when he published *Tr. hurum* in 1829, but I fail to see how that invalidates the fact that, on this point, Dr. Gray must have changed his mind at the date of publication of his first catalogue in 1844, and his second catalogue of Shield Reptiles in 1855, where he sinks *hurum* to the rank of a synonym only, and where it so remained till the appearance of Dr. Anderson's paper, that is to say, if we may assume Dr. Gray's views to be represented in the above works bearing his name.

In the November number of the Annals and Magazine of Natural History for 1872, Dr. Gray publishes a paper on the "Mud Tortoises of India," and here for the first time that I can discover since the publication of his catalogue of Shield Reptiles does Dr. Gray record *Tr. hurum* as an independent species, and strange to say, Dr. Anderson, who so shortly before had elaborated this view *de novo*, is not anywhere mentioned. Comment on this is needless.

An important question now arises whether the conclusions arrived at by Dr. Anderson in the above paper, and adopted by Dr. Gray, are sound? Dr. Anderson is lucid and concise in his statements, but they are so startling that I shall give a brief quotation. Speaking of the young of *Tr. gangeticus*, Dr. Anderson remarks:—"Young individuals with these characters have greenish olive shells, vermiculated with fine black lines; and of the large series of specimens that has come under my observation, *not one has presented any trace of ocelli.*" On the other hand, *Tr. hurum*, as Dr. Anderson would restrict it, usually possesses four ocelli in the young state "with the yellow spot on the temporal region, and another at the angle of the mouth with a yellow band across the snout," &c. Now, without pretending to anything like the experience which Dr. Anderson possesses, or the great resources at his disposal, I greatly question, or rather altogether distrust,



the above generalization. Not long since I received a living *Trionyx* which fairly corresponded outwardly with the figure of *Tr. hurum* in Gray's Illustrations. This specimen, when prepared, proved (by its skull) to be a true *Tr. gangeticus*. I then prepared (no specimens existing for comparison in the Imperial Museum) the skull of a small *Trionyx* I had in spirit in the precise livery of *Tr. ocellatus*, Gray, and this likewise afforded a skull which I should decidedly identify as that of *Tr. gangeticus*.

The mandibular symphysis was longer in proportion than in the adult, and in this character it approached the species indicated by Anderson as *Tr. hurum*, but the convex profile was quite that of *Tr. gangeticus*. The proportionate length of the head, too, anterior to and posterior to the front rim of the orbit, measuring to the nasal bones, was that of *Tr. gangeticus*; in *gangeticus* the proportion being 1 to 7.70; in *Tr. stellatus*, 1 to 5.90; in the young specimen of *Tr. ocellatus* type, 1 to 7.20. It is moreover incredible to me that all the ocellated specimens one sees should belong to *Tr. hurum*, assuredly a rare species, adult in Bengal, and I think therefore that Dr. Anderson has entirely misunderstood the question, and whilst correct in separating the species he terms *Tr. hurum* from *Tr. gangeticus*, he is in error as to the differences whereby he distinguishes them, in the young state, and ocellated livery.

What I believe to be the case is this:—We have in Bengal an extremely abundant and rather variable species, *Tr. gangeticus*, Cuv., some of the varieties of which have been considered as distinct species by Gray and others, and two of which have lately been re-established under the old name of *hurum* by Dr. Anderson followed by Dr. Gray as described above. In addition to these better known varieties, there is, very rarely met with in Bengal, a second species, confounded by Dr. Anderson with the two so-called species *Tr. hurum*, Gray, and *Tr. ocellatus*, Gray, the whole being united under the name *Tr. hurum*, Gray, *apud* Anderson. To this I shall revert presently, but I here give the synonymy of *Tr. gangeticus*, Cuv., in accordance with the above view.

*TR. GANGETICUS*, CUV.

*Tr. (Testudo) hurum*, Buch. Ham., MSS.

*Tr. (Testudo) gatajhal*, Buch. Ham., MSS.

*Tr. hurum*, Gray, Ill. I. Z.

*Tr. ocellatus*, Gray, Ill. I. Z.

*Tr. hurum*, Gray, Ann. Mag. N. H., Nov. 1872, 331 in part.

*Tr. hurum*, Anderson, Ann. Mag. N. H., May 1872, in part.

This is the common *Trionyx* of Lower Bengal, and though variable in its markings may be always distinguished from the next by possessing in some form or other the dark streaks and lines on the head at all ages, which the other never does. At page 85 of the Annals and Magazine of Natural



History for 1871, Dr. Gray commits a serious error in stating that this species never exhibits the "semicircular bone in the front of the sternum, covered with a lunate callosity," for such will, I think, be found in all aged specimens of *Tr. gangeticus*, though not developed till the animal has nearly attained its full size. Dr. Gray's views seem in this matter to run in extremes. In his Catalogue of Tortoises, &c., dated 1844, at page 46, he writes:—"The sternal callosities appear and increase in size as the animal increases in age, hence they do not afford specific, much less generic, characters." So far from this being the case, the characters of the osseous plates of the sternum would seem to be one of our best means for diagnosing the different species of *Trionychidae*, without accepting the later view of Dr. Gray and making them of generic value, by strictly following which method we should risk placing the young animal in one genus, the mature animal in another, and the aged and patriarchal member of his race, in a third!

This lunate callosity is also found in *Tr. Phayrei*, Th., and equally well developed in the species identified by Dr. Anderson as *Tr. hurum*. This is well exemplified in the skeleton of a superb male in the Imperial Museum and in a more completely ossified sternum referred by me to this species in my own possession, this last sternum measuring 15 inches, with a lunate callosity two and a half inches across. The fact is, this fifth lunate callosity is one of the generic characters in *Trionyx* in its perfectly adult state, though sex may perhaps influence the size the lunate plate may assume. It cannot therefore serve, as it has been made to do, in its nascent state, before the coalition of the two osculant patches of the immature animal, as a generic character of *Landemania* or any other genus.

The second species alluded to above is represented in the Imperial Museum by a stuffed female, half grown, the skull and sternum of which are mounted for examination, and the superb skeleton of a male, fully adult, with a sternum of 15 inches. This fine species seems to have been quite overlooked or confounded with *Tr. hurum*, which, as I have shown above, is a synonym of *Tr. gangeticus*, Cuv., and as it is requisite to bestow a name on it, I propose terming it *Tr. Buchanani*, n. sp., with the following synonymy:—

*Tr. BUCHANANI*, n. sp.

*Tr. hurum* Auctorum in part.

I am not prepared to say wherein it differs externally from *Tr. gangeticus*, Cuv., but it may be at once distinguished most easily by its skull, which is more taper, and by the mandible possessing a median groove inside, quite different from the same bone in *gangeticus*. It is closely allied to *Tr. stellatus*, Geoff., but differs in having a slightly narrower head behind, and less pointed one in front, and by the median mandibular groove, for in *Tr. stellatus*, in place of a groove, there is



a well-marked median ridge. This point will alone suffice to discriminate the two species without a description of the soft parts, which I have no materials for giving. I of course do not regard it yet as *satisfactorily established*, that, according to Dr. Anderson, every ocellated *Trionyx* in Bengal belongs to this species, but should this fact be established, it will form an external mark for diagnosing between young individuals.

The third species of this paper is *Tr. stellatus*, Geoff.

I have myself a single specimen procured at Moulmein, of which I give a figure reduced to one-third of the natural size, and figures of the head of the full natural size. This species possesses none of the dark marks on the head seen in *Tr. gangeticus*, or described by Günther as met with in *Tr. javanicus*, though that author cautiously adds:—"The characteristic markings of the head of the continental specimens are not mentioned in descriptions of Javan individuals, so that both may be specifically different."—*Günther's Reptiles, Br. India*, p. 48.

The plates of the species here given may enable others to determine the species more satisfactorily, but as far as the materials and books of reference at my command enable me to judge, I am inclined to refer it to *Tr. stellatus*, Geoff., a head of which is figured in the *Fauna Japonica*, published in 1833.

*TR. STELLATUS*, var Javan, Geoff., S. H. Siebold, *Faun. Jap. Chel.* Tab V. f. 6.

*Tr. javanicus*, Schw., *apud Günther*, in part, not *Tr. javanicus*, Gray.

*Tr. peguensis*, Gray, *Supp. Cat. S. R.*, p. 90.

*Tr. hurum*, Gray, *Ann. Mag. N. H.*, 1872, p. 366, as *Tr. Phayrei*.

*Skull of an adult*, *apud Gray*, *P. Z. S.*, 1869, p. 217.

"*Leik-kway*" of the Burmese.

I was at first much inclined to unite this species with the last, but they are, I am convinced, distinct, as all other differences apart, the shape of the head and the mandibular ridge in the one being represented by a mandibular furrow in the other, are characters sufficient to establish their distinctness. The dorsal disk too of *Tr. Buchanani*, Th., would seem to be much smoother than in *Tr. stellatus*, and less furnished with tubercles or warts, (if furnished at all) a point that can hardly be judged from a half grown and fully adult specimen.

The skull mentioned without name in the Proceedings of Zoological Society, and subsequently described by Dr. Gray as *Tr. peguensis*, belonged to an animal taken by a fish hook from the Sittoung river at Tonghoo, and has probably outgrown the spotted stage figured in the *Fauna Japonica*. During life, the Moulmein specimen displayed yellow-coloured spots, but the yellow gradually fades after immersion in spirit, and hence is not mentioned in descriptions, or rather described as white.

I now come to the consideration of a species which would seem to be



much commoner than the last in Burmah, but most rare, if not altogether wanting, in India. I give what I believe the the synonymy of this species, and must premise that in this case, as in the others, I have not attempted to evolve the less obvious synonyms, as mere speculations, without access to original figures, descriptions, or specimens, are of little value.

*Tr. CARINIFERUS*, Gray, Cat. Shield Rep., p. 67, Plate XXXII.

*Tr. javanicus*, Schw., *apud Gunther, in part.*

*Tr. Phayrei*, Theob., *Jour. Latin Soc. Zool.*, Vol. X.

*Tr. jeudi*, Gray, *Proc. Zool. Soc.*, 1869, p. 217.

*Tr. formosus*, Gray, *Proc. Zool. Soc.*, 1869, p. 217.

*Tr. Phayrei*, Theob., *apud Anderson, Proc. Zool. Soc.*, 1871, p. 154.

*Leik. beywoon, of the Burmese.*

The type specimen was obtained alive by myself in the Arakan range, west of Pegu, the dried shell being presented by me to the Bristol Museum, and the skull to the British Museum. The history of this skull I must now endeavour to unravel, not less successfully, let me hope, than I did in the case of *Testudo (Scaphia) Falconeri*, which, thanks to my observation thereon, has now been restored by the Trustees of the British Museum to the Imperial Museum, Calcutta. *Vide* Appendix to Catalogue of Shield Reptiles, 1872, p. 10, *et ante*. In the first place, I may state, as a matter of fact, that but two skulls (exclusive of young animals in spirit) of *Trionyx* passed from my hands into Dr. Gray's, either by gift or purchase, from the simple fact that I only brought home two from Burmah with me, *viz.*, 1st, a head of *Tr. stellatus*, as mentioned above, which Dr. Gray refers to *Tr. hurum* in his paper on the Mud Tortoises of India, in the *Annals* for 1872, p. 336, and probably alludes to without naming as "skull of an adult" in the *Proceedings of Zoological Society*, 1869, p. 217; and, 2nd, the skull of my type of *Tr. Phayrei*, presented by me to the British Museum in 1868 (or 67), which Dr. Gray doubtfully refers to *Tr. hurum* (erroneously as I believe), and which he also indentifies (correctly no doubt) with his *Tr. jeudi*. How comes it then I may ask that; with the type skull of my *Tr. Phayrei*, furnished him by myself, he describes another specimen as *Tr. jeudi*? In courtesy, and to avoid confusion and multiplication of names, Dr. Gray should have given such amended characters as he chose, but without altering the name of my type already published in the *Journal of the Linnean Society*. It is true Dr. Gray remarks (*Annals and Magazine of Natural History*. 1872, p. 336) of my type skull:—"It certainly *is not* the skull of the species described under that name in the *Journal of the Linnean Society*, nor of the Tortoise described under that name by Dr. Anderson." To this I can only say that till Dr. Gray gives some reasonable ground for this statement, I must be allowed to say that I believe it *is*; and this I say, knowing what my own type was like,



having moreover examined Dr. Anderson's aged individual, and with the skull of the individual figured in this paper, before me to compare with Dr. Gray's figure of the skull of *Tr. jeudi*. Dr. Anderson, moreover, having compared the skull of his specimen with Dr. Gray's type of *Tr. jeudi*, equally with myself, holds them to be identical, to which catena of testimony Dr. Gray opposes an assertion seemingly based on no substantial ground whatever.

In the *Annals and Magazine of Natural History*, 1871, p. 85, Dr. Gray refers Dr. Anderson's large specimen of *Tr. Phayrei* to the shadowy genus *Landemania*. But as I have shown that the sternal callosities of *Tr. gangeticus*, Cuv., when aged, really correspond with those of *Landemania*, it is hardly possible to maintain the independent existence of such a mere shred of a genus as the amended character of *Trionyx* would reduce it to; whilst a mere comparison of the species here given, with Gray's figure of *Tr. perocellatus*, *Catalogue of Shield Reptiles*, p. xxxi, will at once show how distinct *Tr. Phayrei*, Th., is from *Tr. perocellatus*, to which Dr. Gray is inclined to refer it.

A careful study, however, of *Tr. cariniferus* depicted on the next plate of the *Catalogue of Shield Reptiles* (xxxii) has convinced me that it is the same species as I subsequently named *Tr. Phayrei*, to which conclusion I am led by the feeble development of the sternal bones and callosities, and the only point which seems to throw doubt on this result is, that the peculiar head-markings are not shown in Gray's figure. No markings whatever are shown on the head, and as this is so rarely the case with a young *Trionyx*, I conclude that the markings either had altogether faded from the specimen, or that the artist had from their indistinctness omitted to copy them.

Dr. Gray, in his note to this species, *Catalogue of Shield Reptiles*, p. 67, makes precisely the same comparison with regard to this species that both myself and Dr. Anderson did in describing our specimens. Dr. Gray's words are:—"The specimens of this species are larger than the stuffed example of *Tr. javanicus*, but yet they have no appearance of any sternal callosities. Bearing in mind that *Tr. javanicus*, Gray, of the above sentence is synonymous with *Tr. gangeticus*, Cuv., the above sentence curiously resembles the description of what I considered the most salient feature of distinction in the sternum of *Tr. Phayrei*, vide *Journal of the Linnean Society*, Vol. X, where I use these words—"the osseous tubercular surface, however, is less developed and more feebly sculptured (the age and size of the specimen considered) than in any of its allies, and at a glance serves to discriminate the present species from them." I need not here attempt any answer to the arguments and mistakes of Dr. Gray regarding this species in his paper in the *Annals and Magazine of Natural History*, for 1871, p. 83, as they have been already fully replied to by Dr. Anderson in the *Annals* for the same year, p. 324.



I append below a few comparative measurements in Mills of the skulls of the species treated of above:—

No. 1.	<i>Trionyx gangeticus</i> , Cuv.	...	(Imperial Museum).
" 2.	<i>Tr. Buchanani</i> , Th.	...	(Imperial Museum).
* " 3.	<i>Tr. stellatus</i> , Geoff.	...	From Moulmein, (Plate III).
" 4.	<i>Tr. cariniferus</i> , Gray.	...	" Moulmein, (Plate IV).

	I.	II.	III.	IV.
Length of skull ... ..	97.	105.	102.	100.
Width behind zygoma ... ..	51.	49.	44.	54.
Longest diameter of orbit ... ..	15.	14.	12.5	14.
Between orbits ... ..	7.	11.5	7.2	11.5
Extremity of skull to anterior rim of orbit ...	73.	98.	77.	89.
Anterior rim of orbit to tip of nasal bones ...	14.	14.	13.	13.
Extreme length of mandible ... ..	58.	66.2	54.5	64.
Extreme height ... ..	21.	24.5	19.	25.
Median depth below in front ... ..	13.	19.	13.	18.

I shall now notice certain statements of Dr. Gray contained in his Supplement and Appendix to the Catalogue of Shield Reptiles, but it is quite beyond my powers, within the reasonable limits of a paper like the present, to follow Dr. Gray through all the changes of species and genera, which he has from time to time introduced.

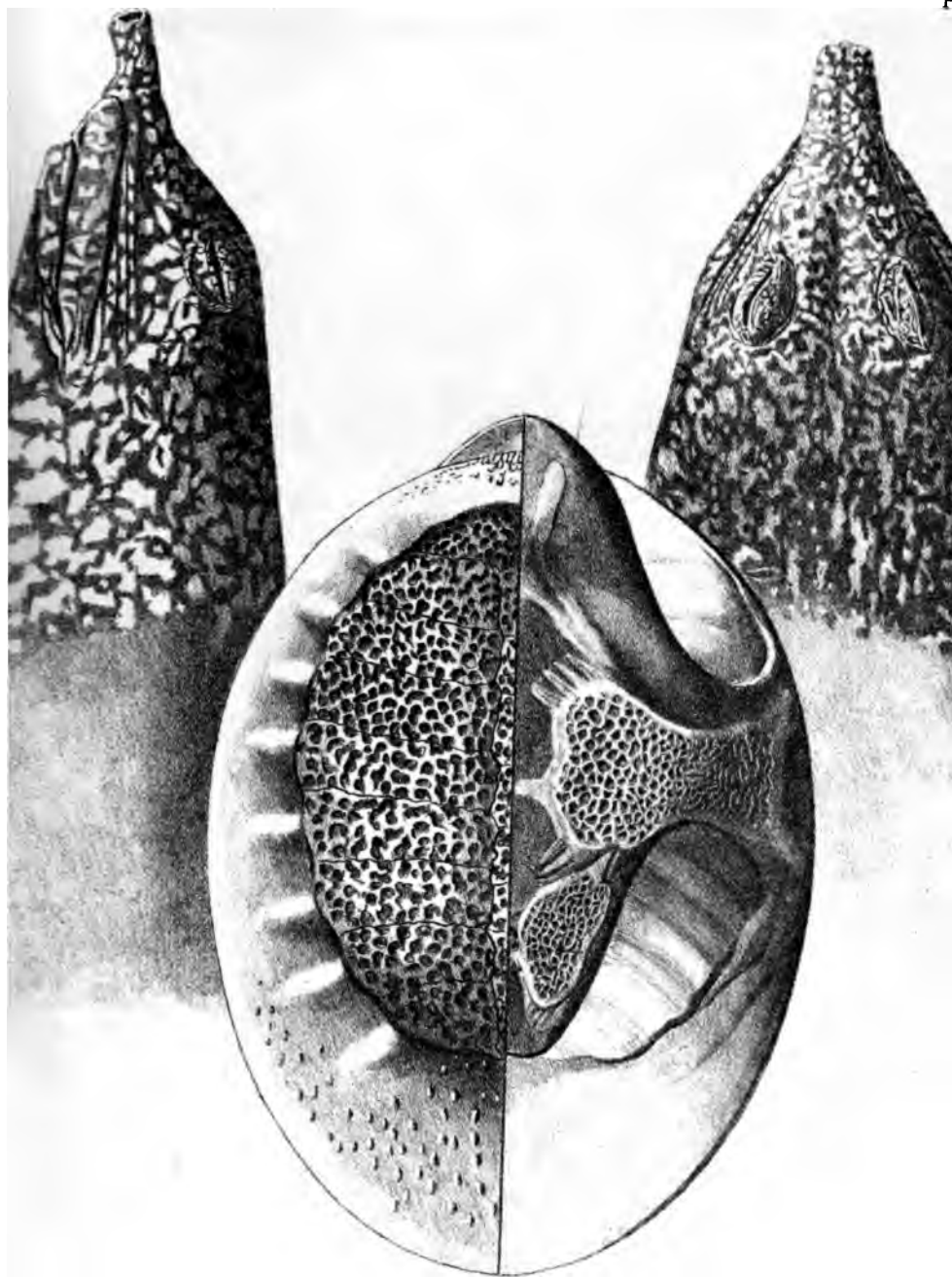
At p. 10 of the Appendix to the Catalogue of Shield Reptiles, 1872, Dr Gray observes under the head *Notochelys platynota*:—"Mr. Theobald in his catalogue confounds this species with *Geomyda grandis*." Now in my catalogue of the Reptiles of Pegu, published in the 10th volume of the Journal of the Linnean Society, *Notochelys* is not mentioned, so the catalogue to which Dr. Gray refers must be that of the reptiles in the Museum of the Asiatic Society of Bengal, published in Calcutta by the Society in 1868, during my absence in England, and in which the only passage referring to *Notochelys* stands thus, p. 10, *Geomyda grandis*, Gray.

*Cyclemys Platynota*, Gray, apud Blyth.

Now I do not see how any naturalist can misunderstand the above passage, or affect to suppose that, in quoting a synonym as understood by another, the man who makes such quotation can be held thereby to endorse it. Had I intended it to be understood that I considered *grandis* and *platynota* synonymous, I should certainly have ranged *grandis* as a synonym of *platynota*, since the latter name dates from 1834, and the former only from 1860 (*vide* Annals and Magazine of Natural History, 1860, and Proceedings of Zoological Society, 1834,) but I did just the reverse, and I do not

\* Both figures are one-third of natural size.

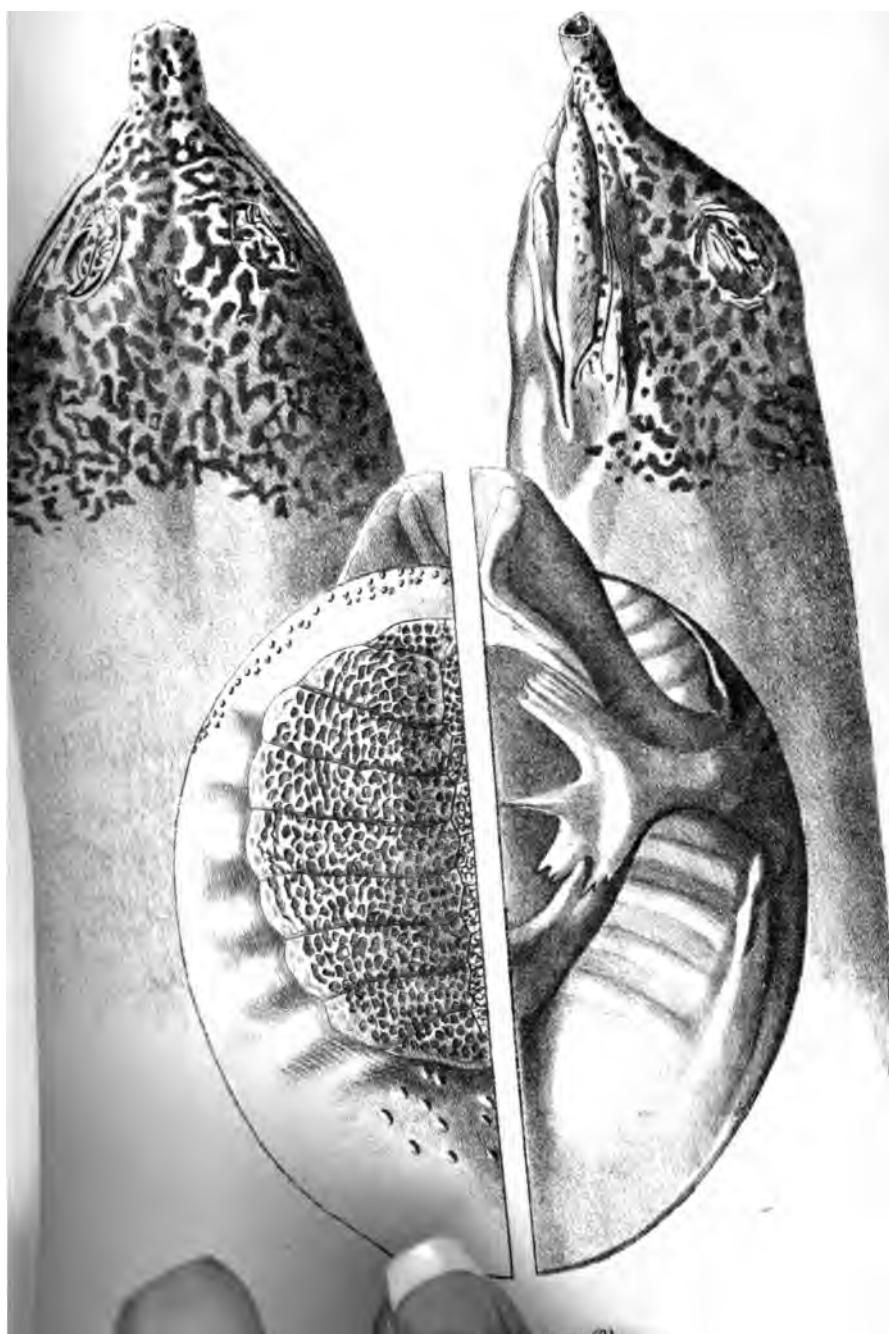




*Trionyx stellatus* Geoff.



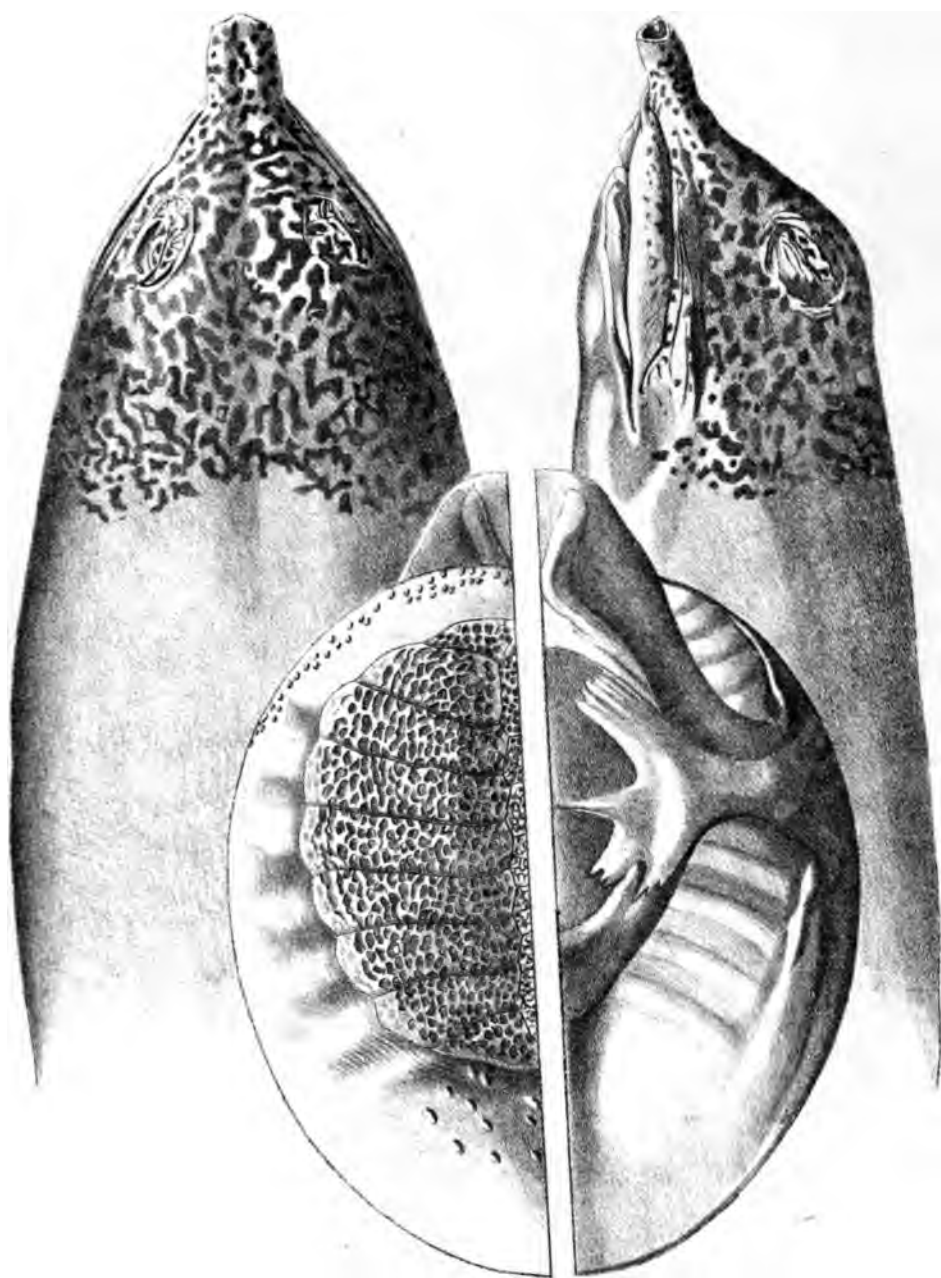
1 Trionyx. Proc As Soc B.











*Trionyx cariniferus* Gray (?).  
*T. Phuyrei* Theob.







understand what shadow of right Dr. Gray had to make so disparaging a statement. The specimen of *Geomyda grandis*, Gray, in question, was presented by myself to the Museum in 1855, and consisted of a carapace only, hence it was doubtfully referred at the time by Blyth to *Emys platynota*, Gray (*vide* Journal of Asiatic Society, Vol. XXIV, pp. 712 and 714), and I entered this identification of Blyth's as a synonym of the above specimen, being careful to add "*apud* Blyth," in order to guard against the possible error of future compilers recording, on the above erroneous identification of Blyth, the occurrence of *Notochelys platynota*, Gray, in Tenasserim, whence it had never to my knowledge been obtained.

Under the head "*KACHUGA*," Appendix, Catalogue of Shield Reptiles, p. 17, Dr. Gray endeavours to throw the blame of the complete muddle of *habitats* of the specimens in my collection on myself, with what justice and truth I shall now endeavour to show. To take *Kachuga peguensis* first; this species is based on a head stated to have been presented by "W. Theobald Esq., India;" *vide* Proceedings of Zoological Society, 1869, p. 200, Fig. 12. Now if there is any point I have laboured to convey, it is that India is not Pegu, or Pegu India, and, consequently, if I gave the *habitat* "India," it assuredly never came from Pegu. Referring, however, to the same skull in Appendix to the Catalogue of Shield Reptiles, p. 18, Dr. Gray says:—"The skull figured as *Kachuga peguensis*, Fig. 20, was purchased of a dealer to whom Mr. Theobald had sold it among some reptiles said to have come from Pegu."

Now it is clear that both these conflicting statements as to how the type of *K. peguensis* came into Dr. Gray's hands cannot be true, and equally clear is it also, that I can in no ways be held responsible for such contradictory statements; but towards clearing up the imbroglio, I will contribute a fact or two that may be useful.

If Dr. Gray is correct in considering his species, *K. peguensis* as a synonym of *K. trilineata* (*vide* Supplement, Catalogue of Shield Reptiles, p. 54), then the specimen undoubtedly never was received from me, and equally undoubtedly never came from Pegu; since *B. lineata*, Gray (Catalogue of Shield Reptiles, p. 35) does not occur in Pegu, where it is replaced by the larger species *B. trivittata*, Dum. et Bib., but as Dr. Gray seems sure the type was received from me, it must have been a Pegu specimen of *B. trivittata*, Dum. et Bib., as I had in my collection several shells and skulls of that species, but only one or two shells, but no skulls of the other. Why, moreover, *B. lineata*, Gray, of p. 35, reappears as *K. trilineata*, at p. 54, I don't know; still less can I imagine, why the entirely distinct *B. trivittata*, Dum. et Bib., should figure as a synonym of it, with my name attached to it in the Supplement, at pp. 54, 55. I specially protested in person to Dr. Gray against the idea of the Pegu form being an Indian species



leaving the correctness of my identification of it with the *B. trivittata*, Dum. et Bib., an open question, and yet Dr. Gray transfers my description of the animal of the Pegu *trivittata* to the Indian *lineata*, a perfectly distinct animal.

**HARDELLA THURGI.** Under this head in his Appendix to the Catalogue of Shield Reptiles, p. 18, Dr. Gray indulges in a singularly disingenuous piece of criticism, breaking off his quotation of what I wrote, just where my words show that I had anticipated him in removing "*Thurgi*" from *Emys* to *Batagur*! Dr. Gray writes (*loc. cit.*):—"Mr. Theobald observes that *this species is very common at Calcutta, though adults are not very easily obtained* (the italics are my own). It appears to be more allied to *Batagur* than *Emys*, yet he did not discover that the skull that I had figured as *Kachuga Oldhami* was the skull of this species," &c. I would remark that Dr. Gray established his spurious species *K. Oldhami* in March, 1869, whilst the passage Dr. Gray quotes above was published in my Catalogue of Reptiles of the Asiatic Society, Bengal, in 1868! The exact words I really wrote are as follows, which I give for comparison with the above:—

"*A very common species at Calcutta, though adults are not very easily-got. It appears to me more nearly affined to Batagur than to Emys.*" This was the sum total of my remarks, and it was not till two years later that Dr. Gray pronounces his adhesion to the above view in his Supplement to the Catalogue of Shield Reptiles, p. 58, in the following words under the head of *Hardella Thurgi*:—

"By examining the head of the adult specimen in the British Museum, I have been enabled to prove, what I have long suspected, that *Thurgi* is a *Bataguroid*; and also to identify the skull which I figured as *Kachuga Oldhami* as the skull of this species!" Dr. Gray may truly be congratulated on the complacency with which he refers to his labours on the craniology of the *Testudinata* when within the compass of a few pages he describes as new species, three old and two of them well-known forms, *e. g.*, *Scaphia Falconeri*, Gray = *Testudo Phayrei*, Blyth; *Kachuga Oldhami*, Gray = *Batagur Thurgi*, Gray; and *Kachuga peguensis* = *Batagur lineata*, Gray, as admitted by himself in Supplement to the Catalogue of Shield Reptiles, p. 56, and to crown all his founding his genus *Potamochelys* on a skull of the common *Emyda*! *vide* Ann. of 1872, p. 340.

My reason for so summarily disposing of Dr. Gray's new species *Kachuga Oldhami* was this: I had examined Dr. Oldham's specimens before they passed into Dr. Gray's hands, and if the new species was *really*, as stated, founded on one of Dr. Oldham's specimens, I knew it must be founded on one of our common *Batagurs*, which one, however, I had neither means or leisure to determine,



and rested content therefore with recording my belief to that effect in a paper communicated to the Zoological Society, an abstract of which however was all that was allowed to appear in its Proceedings.

Finally, I will hazard placing on record my distrust of the correctness of Dr. Gray's identification of the skull of *Emys* (*Melanochelys*) *trijuga*, Supplement, Catalogue of Shield Reptiles, p. 34, on the ground that to the best of my recollection no such species was contained in Dr. Oldham's collection. At all events, no harm can be done by my so doing.

CALCUTTA, July 21st, 1873.

P. S.—Since penning the above paper, the Proceedings of the Zoological Society of London, Part I, for 1873, have come into my hands, wherein a paper by Dr. J. E. Gray on the *Trionychidæ* calls for some remarks from me, which I prefer embodying in the form of a postscript, rather than intercalating in the preceding pages.

The first point I have to notice is Plate VIII, whereon two specimens of *Tr. gangeticus*, each of which display four well marked ocelli, are figured. From this it is clear that Dr. Gray is no less incredulous than myself of the correctness of Dr. Anderson's observation that this species never presents ocelli, as I have shown above. This is a point however whereon further information is desirable, and I shall look with some interest to what Dr. Anderson may subsequently have to urge in corroboration of his view. The next species I would notice is *Nilssonia formosa*, p. 45, under which head Dr. Gray expresses himself as follows:—"It appears that this and the other *Trionyx*, marked "Pegu," do not really come from that place; for although the collection was sold as from "Pegu," it contained many specimens from other parts of Hindustan."

The above sentence, as it stands, is extremely unintelligible. In the first place, *by whom* were the specimens marked as coming from Pegu, which in reality came from somewhere else, and what is meant by *marking*? I do not remember that I ever marked any *Trionyx*, and I certainly challenge Dr. Gray to substantiate his assertion by producing some of the many specimens sold by me as coming from Pegu, but in reality coming from Hindustan. As a matter of fact, I can assure Dr. Gray that, if *Nilssonia* was described from a specimen in spirit in my collection, it assuredly came from Pegu, and Dr. Gray has been much misinformed by any one who has asserted the contrary. But why does not Dr. Gray give his authority for *now* stating that *Nilssonia* does not come from Pegu. Had he done so, the rectification of such incessant and petty errors would not be the never-ending task it is. Then again what is "the other *Trionyx* marked Pegu," and to whom is Dr. Gray indebted for the information that the two adult skulls of *Trionyx* procured by me in Pegu, both of which moreover perished by my revolver bullet, did not come from that province? Till Dr. Gray condescends to state the authority on which he



makes the above *quasi* corrections of the *habitat* furnished by the original possessor of the specimen, little real progress can be made in obviating such mistakes in future; as far however as can be judged at present, Dr. Gray seems to be himself mainly to blame.

*Tr. hurum*, Buch. Ham.

*Tr. sewaare*, Buch. Ham.

*Tr. ocellatus*, Gray.

At pages 49, 50, 51, Dr. Gray separates all these forms as distinct species, but without characterising them.

As regards *Tr. hurum*, I have nothing to add to what I have remarked previously in my paper. Of *Tr. sewaare*, Dr. Gray figures "*the skull of a young species*," which fairly corresponds with a skull extracted by myself from a fresh example of a *Trionyx ocellatus*, Gray. As far therefore as present materials allow us to decide, all these three names must rank as mere synonyms of *gangeticus*, though they have all probably been unwittingly applied to another species, which in the above paper I have separated under the name of *Tr. Buchanani*.

*Isola peguensis*.—At p. 51, Dr. Gray establishes a new genus, *Isola*, for the reception of the skull of a *Trionyx*, procured in Pegu, by myself, displaying the effects of my revolver bullet on it, but which, as I have shown above, Dr. Gray now considers to have come from Hindustan (*vide* p. 45). This species, if not identical with, is very closely allied to, *Tr. stellatus*, Geoff., but the coloration of the head of this species (if my identification of it, *vide* Plate III, is correct) would seem to differ from Dr. Gray's description of an example in spirit.

2. *On the discovery of a super-orbital chain of bones in the Arboricolæ (Wood Partridges).*—By J. WOOD-MASON.

This note will be printed in Journal, Part II, 1874.

3. *Description of new Marine Mollusca from the Indian Ocean.* By MESSRS. G. and H. NEVILL.

This paper will appear in Journal, Part II, No. 1, 1874.

The President then addressed the meeting as follows:

Gentlemen, before we separate this evening, I should wish to say a few words in tribute to the memory of one who laboured long and well in the interest of this Society, and of whose death we have so lately heard.

I speak of Mr. Blyth, of whose loss we must all of us have heard with unmixed regret. On looking round, I do not find one present who had sat with him at this table or who had worked with him here in India, and who could speak personally of his labours, not that such is necessary, for our Journal teems with his work, and his name is familiar to every naturalist in India, and to every working member of this Society.



I feel that not being a naturalist, I am unable to do adequate justice to his work. Mr. Blyth came out to India in 1841. He was the first Curator of the Museum of this Society, and in that year took over the office which had previously been honorary.

This office he retained till 1863 when he retired on a small pension granted by the Government of India for his excellent service.

His works were—before he came to India, an English translation of Cuvier's "Regne Animale," in which the Mammals, Birds, and Reptiles were edited by him; many of his own notes suggesting modifications in the then existing systems of classification, have been subsequently fully substantiated and adopted.

After his arrival in India, most of his works appeared in the Society's Journal, where these papers are so numerous, and their value so well known, that there can be no necessity for me to do more than refer to them.

Mr. Blyth was an enthusiastic zoologist, he lived for his science and probably had the greatest knowledge of Indian Birds and Mammals of any naturalist of his time.

#### LIBRARY.

The following additions have been made to the Library since the meeting held in February last.

#### *Presentations.*

\*\*\* Names of Donors in Capitals.

Philosophical Transactions of the Royal Society of London, Vol. 162, Part 11.

*General Sir Ed. Sabine*—Contributions to Terrestrial Magnetism, No. XII. *Sir B. C. Brodie*—An Experimental enquiry on the Action of Electricity on Gases,—I, on the Action of Electricity on Oxygen.

#### THE ROYAL SOCIETY OF LONDON.

The Transactions of the Linnean Society of London, Parts II and III. 1873.

Part II, *Professor Oliver and Col. Grant*—The Botany of the Speke and Grant Expedition, an Enumeration of the Plants collected during the journey of the late Capt. J. H. Speke and Capt. (now Lieut.-Col.) J. A. Grant from Zanzibar to Egypt.

The Journal of the Linnean Society, (Zoology), Vol. XI, Nos. 55 and 56.

No. 55. *A. Muller*—Note on a Chinese Artichoke-gall (mentioned and figured in Dr. Rance's paper "on Silkworm oaks,") allied to the European Artichoke-gall of *Aphilothrix gemma*, Linn.

No. 56. *Ed. Saunders*—Description of *Buprestida* collected in Japan, by G. Lewis, Esq., *Surgeon-Major F. Day*—On some new Fishes of India.

(Botany), Vol. XIII, Nos. 68-72.

No. 69. *W. Mitten*—New species of *Musci* collected in Ceylon, by Dr. Thwaites. *W. A. Leighton*—On two new species of the Genus *Mycoporum*, Flotow (Bamboo-lichens from Pegu). *W. T. T. Dyer*—On the determination of three imperfectly known species of



Indian *Terustramiace*. *F. Curry*—On a new Genus in the order *Mucedines*. (describes a fungus found on the flowers of *Hibiscus rosae sinensis* in Calcutta).

No. 72. Note on *Cunninghamia infundibulifera*.

THE LINNEAN SOCIETY OF LONDON.

Journal of the Chemical Society, August and September, 1873.

*Dr. H. Sprengel*—On a new class of Explosives, which are Non-explosive during their Manufacture, Storage and Transport.

THE CHEMICAL SOCIETY OF LONDON.

The Journal of the Anthropological Institute, 1873, July and October.

*Lieut. S. C. Holland*—Exhibition of Aino Photographs. *W. L. Distant*.—Eastern Coolie Labour.

THE ANTHROPOLOGICAL INSTITUTE OF GREAT BRITAIN AND IRELAND.

The Transactions of the Royal Irish Academy, Vol. XXIV. (Science), Parts 16 and 17 and Vol. XXV, Parts 1-3.

Part XVI, *E. S. Ball*—On small oscillations of a Rigid Body about a Fixed Point under the Action of any Forces and more particularly when Gravity is the only Force acting.

Proceedings of the Royal Irish Academy, Vol. X, Part IV. Vol. I, New series, Nos. 2-6.

THE ROYAL IRISH ACADEMY OF DUBLIN.

Bulletin de la Société de Géographie, Décembre, 1873.

THE GEOGRAPHICAL SOCIETY OF PARIS.

Bulletins de la Société D'Anthropologie de Paris, Vol. VII. Fasc. 5 Vol. VIII. Fasc. 1 and 2.

Vol. VII. Fasc. 5. *Hamy*—Sur les travaux de M. Janneau relatifs à l'anthropologie du Camboge. *Hamy*—Les négritos à Formose et dans l'archipel Japonais.

Vol. VIII. Fasc. 1. *De Quatrefages*. Sur les populations du bassin de l'Amour.

Fasc. 2. *Martin*—Chinois et Miaotze.

THE ANTHROPOLOGICAL SOCIETY OF PARIS.

Monatsbericht der Königlich Preussischen Akademie der Wissenschaften zu Berlin, 1873, November.

*Buschmann*—Über die Krama-Verandlung in der Javanischen Sprache.

THE ROYAL PRUSSIAN ACADEMY OF SCIENCES OF BERLIN.

Jahrbuch der K. K. Geologischen Reichsanstalt. Band XXIII, Nos. 1-2.

Ueber einen neuen Fossilen Saurier aus Lesina, von Dr. A. Kornhuber.

Die Cephalopoden fauna der Gosauschichten in den Nordöstlichen Alpen, von A. Redtenbacher.

THE IMPERIAL GEOLOGICAL INSTITUTE OF VIENNA.

Atti della Reale Accademia delle Scienze di Torino, Vol. VIII, Disp. 1a,—6a.

Disp. 1a. *Salvadori*.—Relazione intorno ad una memoria del signor Tapparone-Canefri riguardante *Una nuova specie del genere Nephrops*.

THE ROYAL ACADEMY OF SCIENCES OF TURIN.

Mémoires de la Société Royale des Antiquaires du Nord, 1872.



Aarboger for Nordisk Oldkyndighed og historie 1873, Hefte 1-4.

THE ROYAL SOCIETY OF NORTHERN ANTIQUARIES, COPENHAGEN.

Bulletin de l'Académie Impériale des Sciences de St. Petersburg.

Tome XVII, Nos. 4 and 5, and Tome XVIII, Nos. 1-2.

Tome XVII. No. 4. *C. J. Maximowicz*—Diagnoses des nouvelles plantes du Japon et de la Mandjourie, Onzième décadc. *H. Wild*—Un nouvel instrument pour l'observation de l'intensité verticale du Magnétisme terrestre. *B. Dorn*—Extraits des auteurs orientaux, relatifs à la mer Caspienne et aux pays adjacents. *B. Dorn*—Deux pierres avec inscriptions orientales, reçues récemment au Musée Asiatique.

Tome XVIII, No. 1. *Alex. V. Bunge*—Hypogomphia, une nouvelle espèce de labiacées, provenant de Taschkent. *C. J. Maximowicz*—Diagnoses des nouvelles plantes du Japon et de la Mandjourie, Douzième decade.

No. 2. *El. Metchnikof*—Quelques remarques concernant l'embryologie des Myriapodes. *El. Metchnikof*—Quelques observations concernant l'embryologie des Polydesmides.

Mémoires de L'Académie Impériale des Sciences de St. Petersburg.

Tome XVIII, Nos. 8-10 et Tome XIX, Nos. 1-7.

Tome XVIII, No. 8. *H. Wild*—Etudes Meteorologiques.

Tome XVIII, No. 10. *Dr. F. von Asien*.—Berechnung eines Wichtigen theiles der absoluten Jupitersstörge des Enckéschen Cometen.

Tome XIX, No. 1. *Dr. E. Russow*.—Vergleichende enter suchungen betreffend die histiologie (histiographie und histiogenie) der vegetativen und sporenbildenden organe und die entwicklung der sporen der Leitbündel kryptogamen, mit berücksichtigung der histiologie der Phanerogamen ausgehend von der betrachtung der Marsiliaceen.

No. 2. *Dr. Magnus Nyrén*.—Bestimmung der Nutation der Erdachse.

No. 3. *M. F. Schmidt*.—Über die Petrefakten der Kreideformation von der Insel Sachalin.

No. 4. *J. Doell*.—Die Sammlung Cesnola.

No. 5.—*M. Brosset*.—Des Historiens Arméniens des XVII<sup>e</sup>, et XVIII<sup>e</sup> Sècles, Arakel de Tauriz.

No. 6. *A. Schiefner*.—Awarische Texte.

No. 7. *Dr. L. Stieda*.—Studien über den *Amphioxus lanceolatus*.

THE IMPERIAL ACADEMY OF SCIENCES OF ST. PETERSBURGH.

Bulletin de la Société Impériale des Naturalistes de Moscou.

Tome XLVI, No. 1:

*Professor Th. Bredichin*—Observations spectroscopiques du Soleil faites pendant l'été de 1872. *Berg*—Die resultate der Acclimatisation von *Antherea Yama-mayu* G. M. in den Ostsee provinzen. *P. Stepanoff*—Ueber die Entwicklung von *Calyptrea*.

THE IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW.

Journal of the Academy of Natural Sciences of Philadelphia, Vol. VI, Part I.

*J. Lea*—New *Unionidæ*, *Melanidæ*, etc., chiefly of the United States. *E. D. Cope*—On the structures and distribution of the Genera of the Arciferous Anura.

Proceedings of the Academy of Natural Sciences of Philadelphia. 1848—1857, 6 vols. and 1862, Nos. 1-6.

THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.



The Rámáyana, Vol. II, Part IV, by Hemachandra Bhattacharya,

THE EDITOR.

The Christian Spectator, February and March, 1874.

THE EDITOR.

Notes on the Synonymy of some Indian and Persian Birds, with descriptions of two new species from Persia, by W. T. Blanford.

THE AUTHOR.

Journal des Museum Godeffroy, Heft. III. Andrew Garrett's Fische der Südsee, Heft. I., by A. C. L. Günther.

W. T. BLANFORD, ESQ.

De l'Emigration des Chinois du point de vue des intérêts Européens par Ed. Madier de Montjan.

THE AUTHOR.

A Grammar of the Chinese Language, by Professor Leon de Rosny.

THE AUTHOR.

The Zoology of the Voyage of H. M. S. Erebus and Terror, by Sir J. Richardson and J. E. Gray.

DR. J. E. GRAY.

Vocabulary of Dialects spoken in the Nicobar and Andaman Islands, by Fr. Ad. de Röepstorff.

THE AUTHOR.

Mahabharata, Salya, Souptika and Striparvas in Bengali and Sanscrit.

HIS HIGHNESS THE MAHARAJA OF BURDWAN.

The Indian Antiquary, January, February, 1874.

The Flora Sylvatica for Southern India, Part XXVIII, by Major R. R. Beddome.

Icones Plantarum Indiæ Orientalis, Parts X, XI, by Major R. R. Beddome.

Tarikh Irán or History of Persia, Parts I, II, by Sir J. Malcolm

THE GOVERNMENT OF INDIA, HOME DEPARTMENT.

Diary of a Journey through the districts of Minow, Shamil, and Kow Gunow, during the month of August.

THE GOVERNMENT OF INDIA, FOREIGN DEPARTMENT.

Archæological Survey of India. Report for the year 1871-72, Vol. III, by A. Cunningham, C. S. I.

THE GOVERNMENT OF BENGAL.

Report on the Administration of the Punjab and its dependencies for the year 1872-73.

THE PUNJAB GOVERNMENT.

Report on the Trade and Resources of the Central Provinces for the year 1872-73.

THE CHIEF COMMISSIONER, CENTRAL PROVINCES.



**PROCEEDINGS**  
**OF THE**  
**ASIATIC SOCIETY OF BENGAL,**  
**FOR APRIL, 1874.**

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The monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 1st of April, 1874, at 9 o'clock P. M.

Col. H. Hyde, R. E., President, in the chair.

The following presentations were laid on the table :—

1. From the Superintendents of Revenue Surveys, a copy of General Report of the Revenue Survey operations of the Upper and Lower Circles for season 1872-73.

2. From Hyde Clarke, Esq., a copy of Memoir on the Comparative Grammar of Egyptian, Coptic, and Ude.

3. From the Government of India, D. P. W., copies of correspondence relating to the boring of an Artesian Well at Umballa.

4. From D. Ibbetson, Esq., a copy of Engelmann's *Bibliotheca Historico-Naturalis*, vol. I., and a copy of Carus and Engelmann's *Bibliotheca Zoologica*, vols. 1 and 2.

The following gentlemen duly proposed and seconded at the last meeting were balloted for and elected ordinary members—

W. D. Bruce, Esq., C. E.

J. Kimber, Esq., C. E.

The Rev. Fr. E. Lafont, proposed at the last meeting by the Council was balloted for and elected an Associate Member of the Society.

The following are candidates for ballot at the next meeting—

Col. D. G. Robinson, R. E., Director General of Telegraphs in India, proposed by Col. Hyde, R. E., seconded by L. Schwendler, Esq.

F. J. V. Minchin, Esq., of Aska, Ganjam District, proposed by L. Schwendler, Esq., seconded by Captain Waterhouse.

A. Bond, Esq., Bengal Marine Service, proposed by H. H. Locke, Esq., seconded by the Hon. J. B. Phear.

The following have intimated their desire to withdraw from the Society—

Captain E. H. Steel.

A. Rogers, Esq.



The President reported that the Council recommend the following alterations in the Bye-Laws, and stated that according to clause C. of Rule 32, voting papers would be sent round to non-resident members of the Society, and that the alterations would be discussed at the Ordinary General Meeting to be held on the 1st August next.

I. That in Rule 14, instead of the words "*his subscription should be Rs. 12 per annum, commutable into a single payment of Rs. 100,*" the following should be substituted, "*his subscription shall be Rs. 16 per annum, commutable into a single payment of Rs. 150,*" and that the following addition should be made to the rule as it stands at present, "*and provided that members who are at present paying at the rate of Rs. 12 per annum, or who shall have paid Rs. 100 as compensation, shall not be called on to pay the higher rate.*"

II. That in Rule 34d after the word "*chair,*" the following words be added, "*or in their absence the senior member of Council;*" and after the words "*Vice-Presidents*" (2nd) the words "*nor a member of the Council.*"

III. That subject to the concurrence of Government the following Rule be added after Rule 36.

36A. *With reference to the provisions of Act XVII, of 1866, (the Indian Museum Act) Section 3, the Trustees of the Indian Museum, on the part of the Society, shall be nominated from among the members of the Council with the proviso that on vacation of their seats in the Council their trusteeships shall also terminate.*

The President also reported that the Council have nominated Mr. J. Geoghegan, a Trustee of the Indian Museum on the part of the Society in place of Mr. H. F. Blanford, resigned.

Mr. Blochmann exhibited a gold coin forwarded by J. G. Delmerick, Esq., for the purpose of being laid before the meeting. Mr. Blochmann said that it was a rare coin, struck by Mahmūd ibn Muhammad Sháh ibn Tughluq Sháh, a puppet king whose reign was so short and precarious, that the historians scarcely allude to him. Another specimen of the same coin was in the possession of General Cunningham, who more than a year ago mentioned the legend of the coin in one of his letters to the Society.

As the coin was rare, a woodcut had been prepared for publication together with Mr. Delmerick's note in the Journal. Mr. Delmerick thought the date to be 752 A. H. ; but he (Mr. Blochmann) took it to be 754 A. H., and believed that the puppet king was set up at Dihlí during Fírúz Sháh's invasion of Bengal. This would satisfactorily explain the unexpected retreat of the Imperialists from Panquah.

Dr. G. Bühler, of Bombay, gave an account of his tour through Western Rájputáná in search of Sanskrit MSS. He stated that the first



large libraries, which he found, were at Jodhpúr. The Mahárájá of that place possessed a collection of about 1,800 Sanskrit MSS. purchased originally by Mahárájá Mánsingh, the great devotee and student of Yoga and Vedánta, of whom Col. Todd had given an account in his 'Annals of Rájasthán.' The MSS. of Puráṇas, Vedánta and Yoga works were most numerous; and the first included many very rare works. Unfortunately, many of the MSS. were very incorrect and unfit to be copied, though they might be useful for collation. Two MSS., a text of and a commentary on, the Kaushitaki Bráhmaṇa as well as a rare commentary on the Charanarvúha, had been selected for copy. A number of old Jaina MSS. had likewise been bought in the bazar, among which there were a Desināmamálá and a complete copy of the Sanskrit grammar of Hemachandra.

The town next visited by Dr. Bühler was Jesalmír, and there the Bhandár of the Oswál Jinas gave unexpected results. Besides complete sets of the Jaina scriptures with commentaries, very old copies of five dramas, several epic poems and works on Sāṅkhya, Nyāya and Alankāra were found. The oldest of these MSS. dated from Samvat 1160, or 1103-4 A. D.

There appeared to be no doubt that a collation of these MSS. with the known texts would give most important results. Further, about a dozen unknown poems and scientific works came to light, among which there were two historical books. One of these, the Vikramārka-charita of Bilhana, had been already copied, and Dr. Bühler proceeded to give an abstract of a portion of the work. It appeared that it contained the history of the great Chálukya prince, Vikramádityadeva of Kalyánakataka, or Kalbargá, written by his Vidyápati or chief Paṇḍit, as well as notices of his predecessors and of contemporaneous princes, such as Bhoja of Dhârâ and Harshadeva of Kashmír.

Besides the Bhandár, Dr. Bühler saw at Jesalmír four other large Jaina libraries and purchased from paṇḍits and others twenty-three valuable MSS., amongst which there was an unknown Karana by Bhojá of Dhârâ.

Bikāner also, whither Dr. Bühler proceeded from Jesalmír, furnished many valuable books. From the Rájá's library copies of very rare Vedic works, among them the Prātisākhya of the Atharvaveda and the Nāṭya-sāstra of Bharata were obtained. Besides, 120 MSS. were purchased for Government, referring chiefly to the Jaina religion. But also some exceedingly rare Brahmanical books, such as Yuzapurāna of the Gargi saṁshitá and a large portion of the Nyāsa, a Bauddha commentary of the Kāśikā vṛitti, were secured.

Bhatnér, the last town visited, did not furnish as good results as had been expected. But a library containing about 800 MSS. was examined, and some works referring to the history of the Jains and of Gujarát were secured.



The President said, that the Society were very much indebted to Dr. Bühler for the very interesting account he had given of his tour, and proposed that a vote of thanks should be given to the learned professor.

The proposal was put to the vote and carried unanimously.

Mr. Bayley was sure the meeting had heard with interest the lucid account given by Doctor Bühler of his journey and his discoveries. It was unfortunate that several of the members of the Society who would have most enjoyed his relation, were absent, Bábu Rájendralála Mitra for example. Mr. Bayley wished that the Hon Mr. Justice Phear had heard his account of the work which was the ancient authority for the doctrine of the Mitákshara, the discovery of which could not but arrest the attention of all Indian lawyers.

For himself Mr. Bayley confessed that his own predilections inclined to History, and Dr. Bühler's new acquisitions in this subject would, he felt sure, prove invaluable. From a recollection of a conversation with General Cunningham as to the MSS. at Bhatnár, Mr. Bayley thought that Dr. Bühler's conjectures as to the fate which had befallen them were not improbable. He certainly remembered General Cunningham telling him that one of the MSS. at Bhatnár mentioned "Kanishka," and it was not impossible that this was the identical MS. which Dr. Bühler had secured. The only matter of regret was that Dr. Bühler's labour in so promising a field had been hindered by any want of time or money, and it was to be hoped that they would at some future time be resumed under more favourable auspices. Still, as it was, Mr. Bayley was sure that they commanded the interest and respect of those who had heard him to-night, and that Dr. Bühler deserved not only the thanks of this Meeting and of this Society, but of the Government and of the people of India.

The following papers were read :—

1. *Observations on Indian Fishes.* By SURGEON-MAJOR F. DAY.

This paper will be published in Journal Pt. II, No. 1, 1874.

2. *Notes on new Bengal Inscriptions, received from Mr. E. V. Westmacott, C. S.*—By H. BLOCHMANN, Esq., M. A.

These inscriptions will be published in Journal, Part I, No. II. Several of them are of great value, especially one Mahmúd Sháhí of 859; two Firúz Sháhí, one of them of 894; several Husain Sháhí of 899, 907, 918, &c., on which the king is called "the conqueror of Kámru and Kantah;" two Nuṣrat Sháhí of 930 and 938, &c., &c. All these inscriptions, Mr. Blochmann said, had been discovered by Mr. Westmacott in the immediate neighbourhood of Máldah; and he hoped that Mr. Westmacott would find leisure to examine the whole district, which no doubt contained the most valuable materials for the further elucidation of Bengal history.

In connexion with these inscriptions, he would read of Mr. Westmacott's letter on the position of Fort Ekdálah, for which historians had hitherto looked in vain. Mr. Westmacott says—



"From Poroowa (Hazrat Pañḍuah) an old embanked road, called by the people "Nawábí Rastah," runs northward in the direction of Tájpore (not on the maps,) and another runs towards Debkot. Following this road, at a point some twenty miles from Poroowa and four miles east of Churámon, you will see a place marked 'Chilumpoor,' a corruption of Salimpúr. Leave the road at this point, and a mile to the eastward is a place called by the natives EKDA'LAH. It is highland, planted with mango trees, and shewing traces of embankments and brick buildings; and during the rains, when the surrounding country is extensively inundated, it stands up like an island. It agrees marvellously well with the description of the fort which baffled Fírúz Sháh's army from the extent of the inundations surrounding it. It is a good day's march from Poroowa, on one of the military roads, and in the direction in which a Poroowa king would retire before an enemy that came down the Ganges valley to attack him. The people say that the remains are 'Nawábí.'"

3. *On the occurrence of TUPAIA ELLIOTTI, Waterhouse, in the Satpura Hills, Central Provinces.*—By V. BALL, Esq., M. A.

(Received March 8th, 1874.)

To-day I shot a specimen of the Madras Tree-shrew in the terai under the Motúr range of hills. It was a male, and measured 15", of which the tail to tip contributes 8."

It ran out of some long grass and was perched on a stone at the foot of a tree which it was about to ascend, when I shot it.

This is I believe an addition to the hitherto known fauna of the Central Provinces.

Dr. Jerdon says that this species was first procured by Mr. W. Elliot on the hills west of Madras—the continuation of the western Ghats; but that it does not appear to be common.

The discovery of this small animal in the Central Provinces is the more interesting when viewed in connection with the fact that there are to be found there also several species of birds, southern forms, whose occurrence so far north was not known to Dr. Jerdon. Particularly I would mention the Malabar whistling thrush (*Myiophoneus Horsfieldi*, Vigors) which I have obtained both in these hills and also, two years ago, far to the east in the Highlands of Sirguja.

I recognised this animal as a *Tupaia* at once, from having obtained another species last year in the extreme south of the Great Nicobar. Java, Sumatra and Borneo, have each, it is said, got its distinct species of this genus; but whether the Nicobar species is identical with either of these I cannot say, as Dr. Stoliczka took all the Nicobar specimens for



comparison, and his departure for Yarkand has, I believe, prevented him from fulfilling his intention.

*Camp, Satpura Hills, 3rd March, 1874.*

*Note.*—Since writing the above, I have had an opportunity of comparing my specimen with the types from Vizagapatam in the Museum, and assuring myself of the identity of the species. Curiously I find that Mr. Wood-Mason has recently received specimens of the same species from Mr. Lockwood of Monghyr who obtained them in the Karakpúr Hills, thus shewing this little animal to have a very extended range throughout Continental India. A specimen of *Tupaia* from Assam kindly lent to me for examination by Dr. Day, appears to be identical with the Burmese species *Peguana*, Less. It was obtained by Dr. Jerdon at Darjiling, so might naturally have been looked for in Assam.

*Calcutta, 15th March, 1874.*

#### 4. *On an ancient Perforated Stone found in the Satpura Hills.*—

*By V. BALL, Esq., M. A.*

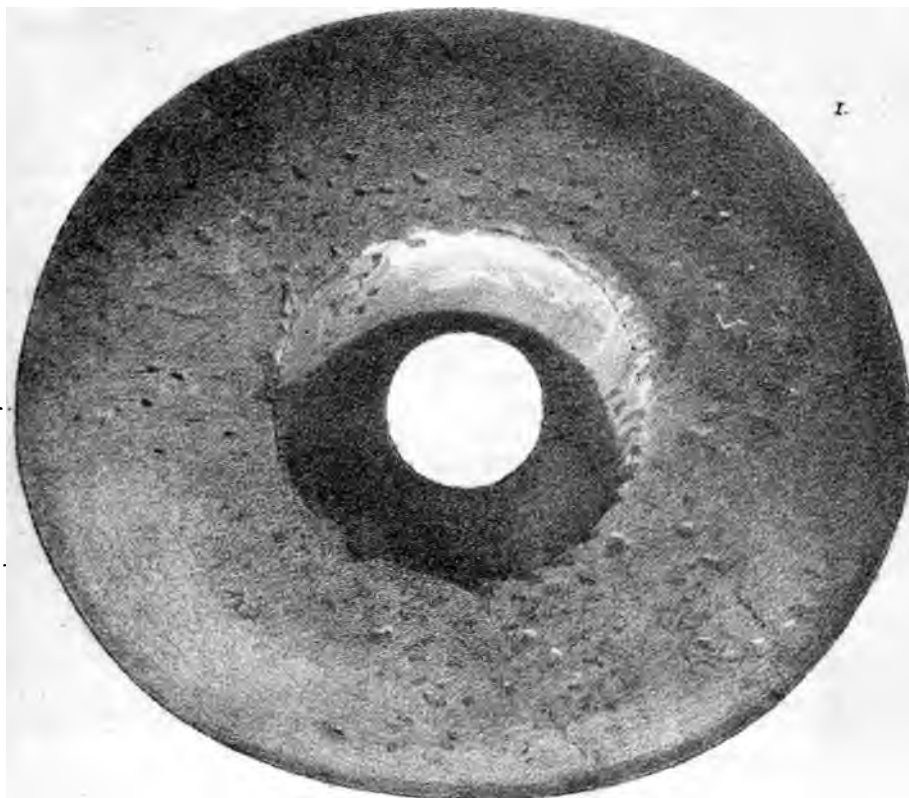
I take this opportunity of exhibiting to the meeting a very curious perforated stone which was found last February on the surface at the Mopáni coal mines in the district of Narsingpur, Central Provinces. The accompanying sketch (Plate V,) will convey an idea of the appearance of this object better than any description could.

It is a water-worn pebble of basalt, weighing 1lb. 10 oz. The central perforation is bevelled away to both faces, a feature which has been observed in some of the perforated stones found with ancient stone implements in other parts of the world. Thus, in a work on Lacustrine dwellings of the lake of Neufchatel by M. E. Desor,\* a figure is given of a stone which only differs from the one now exhibited in being very much smaller. M. Desor says, that with objects of the Bronze period, these discs occur too, but then they are made of baked clay. He supposes that they were used as weights for spindles. The specimen I exhibit is not only too heavy to have been used for that purpose; but the ease, with which the finger, when passed through the perforation, rests against the bevelled sides, and the firm grasp of the stone which becomes thereby possible, suggest that it was used as a hammer. It may even have been used as a kind of "knuckle-duster" in encounters with men or wild beasts; or for flinging like a quoit at small animals.

As it is important that all discoveries of ancient stone implements should be recorded, I add that last year, in the Ranigunj coal field, I found lying on a laterite-strewn surface, a well formed quartzite axe of the ordi-

\* "Les Palafittes ou Constructions Lacustres du lac de Neufchatel, par E. Desor."





RING STONE

Found at Mopani C. P.

(I. Front view II. Section from a to b.)







nary type. The locality was far removed from any possible source of the material of which the axe was formed.

The reading of the following paper was postponed.

Notes and translation of an inscription from Palam sent by J. G. Delmerick, Esq. By Bábu Rájendra Lála Mitrá.

#### LIBRARY.

The following additions have been made to the Library since the meeting held in March last.

#### *Presentations.*

•• Names of Donors in Capitals.

Bulletin de la Société de Géographie, January, 1874.

*Francis Garnier*.—Voyage dans la Chine Centrale (Vallée du Yang-Tzee) (with maps).

#### THE GEOGRAPHICAL SOCIETY OF PARIS.

Monatsbericht der Königlich-Preussischen Akademie der Wissenschaften zu Berlin, December, 1873.

#### THE ROYAL PRUSSIAN ACADEMY OF SCIENCES OF BERLIN.

Journal of the Ceylon Branch of the Royal Asiatic Society, 1872, Part I.

*B. F. Hartshorne*—On Oaths and Ordeals. *W. V. Legge*—Notes on *Prinophilus vincens*. *L. Ludovici*—The Sports and Games of the Singhalese. *J. D'Alwis*—On Miracles. *W. V. Legge*—On the occurrence of *Scolopazrusticola* and *Gallinago scolopisina* in Ceylon. *M. Louis de Zaysa*—Transcript and translation of an ancient copper-plate Sannas.

#### THE CEYLON BRANCH OF THE ROYAL ASIATIC SOCIETY.

Histoire du Bouddha Sakya-Mouni depuis sa naissance jusqu'à sa mort, par M<sup>me</sup> Mary Summer, avec préface et index, par Th. Ed. Foucaux.

#### THE AUTHORS.

Mathurá: a District Memoir, Part I, by F. S. Growse, M. A.

#### THE AUTHOR.

Memoir on the Comparative Grammar of Egyptian, Coptic and Ude by Hyde Clarke.

#### THE AUTHOR.

Stavávalí, by Rájá Káli Krishna Bahádur.

#### THE AUTHOR.

Selections from the Records of Government North-Western Provinces Vol. VI, Vo. 4.

#### THE GOVERNMENT OF THE NORTH WESTERN PROVINCES.

Records of the Geological Survey of India, Vol. VII, Part I, 1874.

*F. Stoliczka*—A brief account of the Geological structure of the Hill Ranges between the Indus Valley in Ladak, and Shah-i-Dula on the frontier of Yarkand Territory. *T. W. H. Hughes*—Notes on some of the Iron Ores of Kumáon. *T. W. H. Hughes*—



Mr. Blochmann exhibited the following rubbings of inscriptions received from General Cunningham, C. S. I., and Messrs. E. T. Atkinson and H. James, C. S.

#### Badá'on.

The following inscription was published from an imperfect *reading*, forwarded to the Society by Mr. Wilson, Badáon, in the Proceedings for March, 1872, p. 49. General Cunningham's *rubbing* enables me to give now a correct reading and translation.

بنای این گنبد متین مخدومه جهان مرحومه مغفوره والدۀ حضرت ملیمانی  
علاء الدنیا و الدین عالمشاه سلطان در عهد سلطنت سلطان مذکور مؤرخا التاسع  
عشر من رجب قدره سنه ست و ستین و ثمانمائه ۱۱

This strong vault of Makhdúmah Jahán, the late mother of his Majesty 'Aláuddunyá waddín 'A'lam Sháh the king, was erected during the reign of the said king. Dated, 19th Rajab (may its honor be increased!), 866 A. H. [19th April, 1462].

The inscription is of interest as it proves that 'A'lam Sháh was allowed, after his abdication in 855 A. H., to retain royal titles at Badáon, where he died in 883 A. H.

#### Dihli'.

The following rubbing is taken from a loose marble slab at 'Aláuddín's Treasury, Qutb Sháh, Dihli. The slab seems to have belonged to the door of the mausoleum of some saintly person, who died in 932 A. H., during the reign of Ibráhím Lodi.

در زمان شه جهان اسلام • شد باند این در سهر جناب  
گرچه صد باب هست جنت را • ایس باب بمثل هذا الباب  
کرد شیخی بنا که در بابش • یوسف ثانی از حق است خطاب  
چون ز تاریخ و نام کردم عرض • گفت درگاه خواجه اقطاب

1. In the time of the king of the Muhammadan world, this heavenly door was erected.

2. Although there are hundred gates in Paradise, there is no door like this door.

3. A Shaikh built it, whom you might correctly call a second Yúsuf.

4. When I made a request regarding its date and name, he [the angel] said, 'The Dargáh of Khwájah i Aqtáb.'

This gives 932 A. H., or A. D. 1524-25.

#### A'grah.

The following inscription belongs to a ruined mosque in the old Burial Ground, at the Ajmír Gate, A'grah.\*

\* A rubbing of this inscription from Mr. A. Carlyle was exhibited in June, 1871. *Vide* Proceedings, for June 1871, p. 127; Keene's Agra Guide, p. 31.



The inscription contains the *Ayat ul-Kursí*, from the second chapter of the Qorán. Below it stands the following line—

بنا کرد در عصر نور الدین جهانگیر عادل پادشاه ابن مسجد و گنبد بندۀ احقر  
حاجی سلیمان در سنه يك هزار و سی و يك ۱۰۳۱

This mosque and dome were built in the time of N ú r u d d í n J a h á n g í r, the just, the king, by the mean slave H á j í S u l a i m á n, in the year 1031 [A. D. 1621-22].

Suja'n Deo, near Alláhábád.

• الله اكبر •

بفرمان شایسته خان میدنا	چو تخت سلیمان بروی هوا
بجز قصد همراهی راهبر	ره از ارتفاعش نیابد نظر
بنای بلند عجب دلکشای	چو فکر بلند اندرین طرف بجای
بشد این بنا در سرمای مینچ	بسال هزار و به پنجاه و پنج
تمام این مکان وسیع لطیف	شد از اهتمام محمد شریف

God is great!

1. By order of Sháístah Khán, our lord, this building, which resembles the throne of Solomon in the air,
2. And the road to which without guidance, on account of its height, cannot be seen,
3. High, wonderful, pleasing, high like thought, and inside remarkable,
4. Was built in this world in the year 1055 [A. D. 1645].
5. This spacious and agreeable edifice was built under the superintendence of M u h a m m a d S h a r í f.

Bana'ras.

The following inscription belongs to the tomb of one La'l Khán, Ráj-ghát, Banáras.

• يا فتاح العليم •

دریغا لعل خان آن مرد یکتا	که بود اندر سخا چو ابر و دریا
سخاوت با شجاعت هردو میداشت	علم در نیک نامی نیک افراشت
مساکین پرور و درویش را دوست	مؤحد بسکه میگفت همه اوست
ز دنیا رخت چون مردانه بر بست	بطل رحمت حق رفت و بنشست
بگفتم سال و عیش نور الله	تعالی مرقده ای مرد آگاه

سنه هجری ۱۱۸۲

O God, the opener, the wise!

1. Alas, La'l Khán! that excellent man, who in liberality resembled the cloud and the ocean,
2. Who possessed both liberality and valour, and raised up high the standard of his fame,



3. A nourisher of the wretched, a friend of dervishes, a unitarian inasmuch as he said 'All is He.'\*

4. When he bravely tied up his things to leave the world, and went to the shadow of mercy and dwelled there,

5. I said that the date of his departure lies in the words, 'May God Almighty illumine his grave, O wise friend!' A. H. 1182 [A. D. 1768].

#### Sakit, N. W. Provinces.

The following rubbings and readings of inscriptions were received from Mr. Harvey James, C. S., by Mr. E. T. Atkinson, C. S., Alláhábád, who kindly communicated them to the Society.

Mr. Blochmann said, Sakít is scarcely ever mentioned by Muhammadan Historians. The emperor Buhlúl Lodí got sick in Sakit and died there. In the *Aín*, Parganah Sakít is mentioned as belonging to Sirkár Qanauj. Its area was 132955 big'ahs, 9 biswahs, and the revenue is stated to have been 3,230,752 dáms.

A most remarkable event, however, in the local history is Akbar's fight with the Sakít dacoits, which according to the *Akbarnámah* took place in the beginning of the 7th year of his reign, (immediately after the conquest of Mair'tha), *i. e.* in the latter half of 969 A. H., or beginning of 1562, A. D. The people inhabiting the villages round Sakít, it is said, stood unrivalled for their rebellious spirit and ungratefulness, especially those of eight places which were collectively called At'hgah.† "The eye of the age never saw rebels, thieves, and murderers like them; they are not only themselves disorderly, but keep the villages and their inhabitants in a disordered state, and they live a bold sort of life, which only fools call bravery." The officers of the district had frequently complained of the inhabitants, when it happened that his Majesty took his way to Sakit in order to hunt. Khwájah Ibráhím Badakhshí‡ was at that time Jágirdár of Sakít. The drivers fell in with a Bráhmaṇ of the name of Hápah, and took him to the emperor; for he wished to complain of the Sakít people, who had murdered his son and plundered his whole property. Akbar next morning resolved to punish the people of the place where the robbery had been committed, and sent a detachment of drivers in advance. When the emperor next morning arrived at the place, the drivers informed him that the people had all fled. Several detachments of soldiers were immediately sent out to hunt down the fugitives, and Qarátaq,§ the imperial Mír Shikár, killed a man and brought another to the emperor who had in the meantime come to the village of Paronk'h (MSS. (پرونكه). or (برونكه)). Here, it was ascertained, the robbers had collect-

\* The usual phrase denoting 'pantheism.'

† The Lucknow edition of the *Akbarnámah* (II, 205) has *At'hgínah*.

‡ *Vide Aín Translation*, p. 435. The inscription of a mosque built by him is given below, on p. 105.

§ *Vide Aín Translation*, pp. 400, 516.



ed and resolved to fight. The whole imperial camp did not consist of more than one thousand people; but as so many had been sent over the surrounding country, the number actually present did not exceed two hundred. There were besides about two hundred elephants in the camp. Although the robbers numbered more than four thousand, the emperor gave orders to attack their fortification. But no success was obtained, and the soldiers on account of the heat produced by the conflagration of the houses, climbed up the trees for protection. Akbar mounted on his elephant Dastkár, and rushed forward;\* but the fire drove him back, and he rode to the rear of the place. When the elephant entered the narrow street of the village, a man in yellow armour (*jaibak*) appeared on the roof of a house. Akbar took him for Dastam Khán,† who had a similar armour, approached the house in spite of the arrows, pieces of wood, and stones that flew about, and found that the man in yellow was Muqbil Khán, who in pursuing a robber had gone up the roof of a house, where he was surrounded by several dacoits. The emperor at once drove the elephant to the house, and Bandah 'Alí, quzbegi of Mun'im Khán and elder brother to Sultán 'Alí Kháldár, ran up and speared the rebels. At the same time, the forefoot of Akbar's elephant sank into a grain-pit, and Jhujhár Khán, the Faujdár,‡ who was sitting behind the emperor, fell with force upon his Majesty. But Akbar remained cool, managed to get the elephant out of the hole, and at once drove up to the place which the robbers had fortified. Only Rájah Bhagwán Dás and Rájah Bidhi Chand were with the emperor, who had to ask the former for a drink of water. A Hindú struck at Akbar's elephant, and the sword hit the iron rings, which for the sake of beauty are attached to the tusks, in so powerful a manner, that the sparks flew about, and the elephant got wild and trampled the robber to death. Immediately afterwards, a boy of about fifteen years, from fright, threw himself from the roof of a house on the emperor's elephant. Jhujhár Khán was on the point of killing him, when the emperor told him to keep him a prisoner.

When they reached the fortified place, they saw that the officers of the imperial elephants had arrived, but stood perplexed on account of the unexpected extent of the fight. They were now ordered to attack the wall. A Rájpút archer aimed seven arrows at the emperor, who caught them with his shield: five of them pierced the shield and passed five and three inches (*unglí*) through the back, and two stuck in the shield without passing through the back. God's protection is quite another shield. 'Aláwal Khán, one of the officers of the elephants, seeing how gallantly the emperor's elephant went forward, called out, "Well done! Who are you? I shall not forget to mention you to his Majesty." Akbar lifted his visor,

\* Abul Fazl says that the emperor himself gave him an account of the fight.

† *Áin Translation*, p. 398. Vambéry spells this name *Dostum*.

‡ *I. e.* an officer in charge of elephants; *Áin Translation*, p. 126.



shewed his face, and politely thanked 'Aláwal for his good intentions. At the same time Tátár Khán called to the emperor not to expose himself to the shower of arrows; but Jhujhár Khán told him to hold his tongue and not direct the attention of the enemy to the emperor by calling out his name. Akbar, still on the same elephant, now broke down the wall and entered the place, joined by three or four other elephants. A good number of the rebels were killed, whilst others retreated to the house which they barricaded. Akbar gave orders to make a hole in the roof of the house and had fire thrown into it. Nearly one thousand people were thus consumed by the flames of divine fury.

Akbar returned towards evening.

Mr. James in a letter to Mr. Atkinson writes as follows—

'You will remember that some time ago Mr. Blochmann asked you whether you could get a place پرونگه or برونگه identified, where Akbar narrowly escaped with his life in a fight with some dacoits. The story is still known among the people here. It was thus. A certain renowned dacoit stole some of the crown jewels from the palace of Fathpúr Sikrí, and fled with them to Paronk'h (परंङ्क), a Thákur village on the Isan in the Mainpúrí district, 9 kos south of Sakít. Akbar demanded his surrender, but the Thákurs refused. On this Akbar came himself with some troops, and besieged Paronk'h. The fort soon capitulated, and the thief was brought bound to the emperor. Then comes a parallel story to that of Col. Blood in Charles II.'s reign. Akbar only complimented the thief on his audacity and rewarded him.

'The remains of the Paronk'h fort, situated in the midst of a kherá, are still visible.'

The following are the inscriptions from Sakít—

1. *Inscription from a mosque built during the reign of Balban* (from a rubbing).

هذا بناء المسجد المبارك في عهد الامام خداوند عالم بادشاه بني آدم نياث الدنيا  
والدين ابو المظفر بلبن السلطان يمين خليفة الله ناصر امير المؤمنين خلد الله  
ملكه وسلطانه و اعلي امره وشانه في ايام قتلغ سلطاني عنا ..... في سنة اربع  
و ثمانين وستماية ۱۱

This blessed mosque was built in the reign of the Imám, the Lord of the world, the King of mankind, Ghiyásuddunyá waddín Abul Muzaffar Balban, the Sulţán, the right hand of the Khalífah, the helper of the Commander of the Faithful—may God perpetuate his kingdom and his rule, and elevate his order and dignity!—in the days of Qutlugh the Royal....., in A. H. 684 [A. D. 1285].

For other Balban inscriptions, *vide* Thomas, *Chronicles*, p. 136; *Proceedings*, A. S. Bengal, May, 1873, p. 94, and the Palam Báoli Inscription, in the *Journal* for this year.



2. *Inscription from a mosque built during the reign of Sher Sháh (from a rubbing).*

بسم الله الرحمن الرحيم

لا اله الا الله محمد رسول الله \* يا الله يا رحمن يا رحيم \* بناء هذه المسجد المباركة في عهد الامام خداوند عالم بادشاه بنى آدم فريد الدنيا و الدين ابوالمظفر شيرشاه سلطان عادل خلد الله ملكه و سلطانه و اعلى بره و شانه كانت في ايام مسعود خان بن مسعود خان متى قبل الله عليه السابح شهر شعبان سنة سبع و اربعين و تسعمائة ||

In the name of God, the compassionate and merciful!

There is no God but Allah; Muhammad is God's prophet. O God! O Compassionate! O Merciful!

The building of this blessed mosque took place during the reign of the Imám, the lord of the world, the king of mankind, Faríduddunyá waddán Abul Muza'ffar Sher Sháh, the just king,—may God perpetuate his kingdom and his rule and elevate his kindness and dignity!—and it was in the days of Sa'úd Khán, son of Mas'úd Khán,.....on the 7th Sha'bán, 947 A. H. [7th December, 1540].\*

3. *Inscription from a mosque built during the reign of Akbar (from a reading).*

بنى هذه المسجد المباركة الشريفة في زمان السلطان الاعظم الخاقان المكرم مولى الملوك العرب والعجم حافظ بلاد الله و الناصر عباد الله حملي دين النبي الحجازي جلال الدين محمد اكبر بادشاه غازي خلد الله تعالى ملكه و سلطانه و افاض على العالمين بره و احسانه امر هذا .... ايات .... نظام الدين ابراهيم خان بدخشي في شهر شعبان سنة سبعين و تسعمائة .... كاتب اسماعيل ||

This blessed mosque was built in the time of the great king, the honored Kháqán, the lord of the kings of Arabia and Persia, the guardian of God's countries, the protector of the faith of the Arabian Prophet, Jalálud dín Muhammad Akbar Pádisháh Ghází—may God Almighty perpetuate his kingdom and his rule and scatter over the people of the world his kindness and liberality!—and it was ordered.....administration..... of Nizámuddín Ibráhím Khán of Badakhshán, in Sha'bán, 970,.....The writer is Ismá'il. [April, 1563, A. D.]

The builder as was remarked above is called in the A'in Akbari and the Akbarnámah 'Khawájah Ibráhím Badakhshí.'

4. *Inscription from the Sarái Ag'hat, Sakit (from a reading).*

نهم جمادي الثاني سنة ١٠٩٧ هجرى مطابق سنة ٢٩ عهد بادشاه اورنگزيب غازي جاكير نواب الهام الله خان عمل فوجدار ميرزا امير بيگ سراي بنا كرد خضر خان و محمد خان و رسول خان نويه مرتب شد ||

\* The Arabic words after Mas'úd Khán seem to be intended for *taqabbala alláh* 'omah, 'may God accept it of him!'



On the 9th Jumáda II., 1097 A. H., in the 29th year of the reign of Aurangzib Ghází, when Nawáb Ilhám ullah was the jágirdár, and Mírzá Amír Beg was the Faujdár, this Sarái was established. It was built by Khizr Khán, Muhammad Khán, and Rasúl Khán Túyah.\* [23rd February, 1686.]

Thus it would appear that Mírzá Amír Beg was Faujdár of the district in 1686. His name is not mentioned in the meagre sources for Aurangzib's reign. Ilhámullah Khán is once incidentally mentioned in the *Maásir i 'Álámگیرى* (p. 249) as having served in the 28th year of the emperor's reign in the Dak'hin.

The Sarái alluded to is also called Sarái 'Abdurrasúl.

Mr. Ball, on behalf of Mr. A. O. Hume, C. S., C. B., exhibited some new species of birds and read the following description of them :—

*New species of Birds exhibited and characterized by MR. A. O. HUME,*  
C. S., C. B.

I beg to exhibit specimens of a few, as I believe, new species of birds.

The first is a Jay ; a *Garrulus*, of the same type as the well known *G. glandarius* of Europe. I propose for it the name of—

(1.) *GARRULUS LEUCOTIS*, its snowy white ear coverts being amongst its most characteristic features. The forehead, lores, orbital region, ear coverts, chin and throat are pure white, there is an enormously broad, but rather short black moustachial stripe. The anterior portion of the crown white, the feathers centered with blackish brown. The posterior portion of the crown, occiput and nape black. Not only the greater primary coverts but also the outer webs of the secondary quills are strongly barred in the usual Jay fashion.

Length 12·5—W. 6·55.

The next is a green Woodpecker, recalling in some points, *striolatus* and *vittatus*, but differing conspicuously from all known *Gecini*, and for this I propose the name of—

(2.) *GEVINUS NIGRIGENIS*. The entire top, back and sides of the head and nape black, in the female, in the male similar, but the crown crimson. Chin, throat, sides of neck and breast, bright turmeric yellow. Abdomen and rest of lower and upper parts much as in *striolatus* but rump crimson. Length of male, 12·82. Wing, 6·4.

Then we have a most lovely *Arboricola*, the most beautiful of the group, which I owe to that indefatigable ornithologist, L. Mandelli, Esq. and which I propose to name after him—

(3.) *ARBORICOLA MANDELLII*. Very few words will suffice to characterize this species. It belongs to the same type, as *rufogularis*, Hodg. and

\* The word *Túyah* is unclear to me ; but as it stands after the name, it must be a family distinction, unless it be a wrong reading.



*intermedia*, Blyth, in that the feathers of the upper back and interscapular region, are neither barred nor fringed with black. The forehead is a deep maroon chestnut, the crown and occiput a rich ruddy olive. The chin, throat, ear-coverts and sides of the neck bright chestnut, the two latter streaked with black; a broad black line sharply defines the chestnut of the throat; in the centre of the base of the throat, there is a snow-white patch, immediately above the black border line. Below this latter the breast is a rich maroon chestnut.

The rest of the bird closely resembles the species already referred to. Length about 8·5; wing 4·75.

A new species of *Gampsorhynchus* may be designated,

(4.) *GAMPSORHYNCHUS TORQUATUS*. Much resembles *rufulus*, but is rather smaller, has a slightly smaller bill, is somewhat more warmly coloured. The white of the head does not extend backwards beyond the crown, nor that of the throat on to the breast. A deep rufous brown band bounds the white of the head every where, being deepest and most conspicuous across the base of the throat where it forms a regular and most marked collar, below this collar the rest of the lower parts are a light rufous buff.

Length, 9·5—Wing, 3·75.

The last bird I describe with some hesitation; it is a *Leiotrichine* form, allied to *Minla* and *Proparus* but distinct from all known species, I believe, of this group. My only reason for doubt is this. In some particulars it closely resembles Mr. Mandelli's *Minla rufogularis*, (*STRAY FEATHERS*, Vol. 1, p. 416), but it is longer, has a smaller wing rather, entirely wants the rusty red throat, and the black and white bands continued over the forehead, which bands in our bird do not extend further forward than the middle of the eye. In other respects, Mr. Mandelli's description would apply fairly well. Could it be that my bird is the female, *Rufogularis* the male? Amongst the species comprised in the various subgenera which may all be included in the genus *Leiothrix*, there are never marked differences in the sexes. Again both Mr. Mandelli and Mr. Brookes, placed *rufogularis* as a *Minla* (I have not myself seen a specimen) whereas, this present bird, is a typical *Proparus* with a still stronger and more Parian bill than *vinipectus*. I think myself it may on the whole for the present be named and I designate it—

(5.) *PROPARUS DUBIUS*. I need only add that the length is 5·5; the wing 2·05; and the tail 2·35, and that besides the differences already pointed out, the plumage of this species further differs from *rufogularis*, in wanting the "crescentic patch of bright fulvous white beyond the ear-coverts," and in having the chin, throat, breast and abdomen pale fulvescent, the flanks and lower tail coverts olivaceous, and the tibial plumes dull pale rufescent.



I take this opportunity of noting that as I find that Col. Tytler's name "*affinis*" for the Andaman Paroquet, which I have recently shown to be distinct from *erythrogenys*, Blyth, from the Nicobars, cannot stand, that name having already been assigned by Mr. Gould to another species of the same genus, I have named the Andaman bird, *P. Tytleri* in memory of my late friend who did so much towards the elucidation of the avi-fauna of the Andaman Islands.

May, 6th, 1874.

The following papers were read.

1. *Notes on a hoard of 543 Sassanian Coins in the possession of Col. H. Hyde, R. E.*—By THE HON'BLE E. C. BAYLEY, C. S. I.

This paper will be published in the Journal, Part I.

2. *Memorandum on the Operations of the Archæological Survey for season 1873-74.* By MAJOR GENERAL A. CUNNINGHAM, R. E., C. S. I.

During the working season which is just now closed, the greater part of the Central Provinces has been explored by my assistant Mr. Beglar and myself, he taking the Eastern half and I the Western half—the division being broadly marked by the high road through Jabalpur and Seoni to Nágpur.

At Jabalpur we examined together the old temple at Bhera Ghát, overhanging the marble rocks. The present temple is small, and apparently a re-construction of part only of the original building; but the circular colonnade which surrounds the temple, with its long line of female statues, all of life-size, is one of the most curious and perfect specimens of Hindu architecture that I have yet met with. The temple and its surrounding statues are dedicated to the worship of Siva; but from the discovery of a single small statue with the well known Buddhist creed, *Ye Dhamma hetu, &c.*, inscribed on the pedestal, I have little doubt that this circular colonnade must originally have enclosed a Buddhist stupa. Each of the female statues has the name engraved on the pedestal, and from the shapes of the letters of these records I would assign the destruction of the Buddhist works and the establishment of the Saiva temple to the ninth or tenth century.

To the north of Jabalpur I explored the ruined temples of Bilahari and of Karnpur near Kári Talai, and obtained good copies of the Asoka inscription on the rock at Rúpnáth. Through the kindness of Mr. C. Grant, Commissioner of Jabalpur, I obtained two copper plate inscriptions containing a land grant of Raja Jayanátha, dated in Samvat 174, which were found at Karnpur.

To the west of Jabalpur I explored the decayed city of Burhánpur, where I made plans of the Jámi and Bibi Masjids—the former being one of the finest Muhammadan buildings in India. It contains a long inscription of



Adil Shah Fārúki with a Sanskrit translation, and also a record of Akbar mentioning his conquest of Khandes and the Dakhin. From Asirgarh I got a second similar record of Akbar, with an inscription of his son Dániyál, and others of Shah Jahan and Aurangzib.

To the south I explored the Buddhist caves and Brahmanical temples at Bhándak, to which place I am now able to restore a long and valuable inscription of the sixth or seventh century, the fine spot of which was unknown. I visited also the colossal sculptures at Lálpet, outside the walls of Chándá, of which the largest measures no less than  $26\frac{1}{2}$  feet in length by 18 feet in breadth and 3 in thickness at the base. I calculate its weight at upwards of 80 tons. The sculpture represents the goddess Durgá, with ten heads, ten arms, and ten legs. On the pedestal there is a bas-relief of Siva performing *tapasya*, or ascetic penance.

Fifty miles to the eastward of Chándá and about 120 miles to the south of Nágpur I visited the famous group of temples at Márkanda, on the Wen-Gangá river. The principal temple of Márkanda Rishi is of the same type as the great temples at Khajuráho in Bundelkhand, the outside being decorated with three rows of statues below and four rows above. Unfortunately this temple was struck by lightning about 200 years ago, which destroyed the upper half of the tower and the roofs of the *máhamandapa*, or main hall, and its side porches. The temple was dedicated to Siva. It is surrounded by about a dozen other temples of the same god under different titles, with a long cloister temple in the back wall of the enclosure, which is dedicated to the ten Avatárs of Vishnu. The sculptures are of the same style as those of Khajuráho, but without their indecency. The temples may be assigned to the ninth and tenth century, but there are remains of former buildings, as well as a broken pillar with an inscription of an earlier date.

On the northern frontier of the Central Provinces I explored the small States of Mahiyar (Myhere) and Nagod. In the former State there is an old temple dedicated to Saraswati, on the top of a lofty conical hill, three miles to the west of the town. The enshrined figure of the goddess has an inscription of four lines on the pedestal, and outside there is a long inscription of 39 lines which is unfortunately much worn by the weather. It opens with an invocation to Saraswati.

In the State of Nagod, which was formerly called *Uchahara*, there are several ancient sites, one of which, named Dhaniya-Majgowa, has yielded a number of copper-plate inscriptions, of which eight are now in the possession of the Raja of Nagod. These records belong to two different families of petty chiefs, of whom the principal representatives are Raja *Hastina* and his sons Sakshabhána and Sarvvanátha in one line, and Raja Jayanátha and his son Sarvvanátha in the other line. At *Bhubhara*, twelve miles to the



west-north-west of Uchahara, I obtained a short record of the last named prince inscribed on a stone pillar.

But the most interesting remains are at *Bharahut*, six miles to the north-east of Uchahara, nine miles to the south-east of the *Sutna* Railway station, and 120 miles to the south-west of Allahabad. In our maps the place is called *Bharaod*, and I believe that it may be identified with the *Bardaotis*, of Ptolemy. It is the site of an old city, which only sixty years ago was covered with a dense jungle. In the midst of this jungle stood a large brick stupa, 68 feet in diameter, surrounded by a stone railing, 88 feet in diameter and nine feet in height. The whole of the stupa has been carried away to build the houses of the present village; but rather more than half of the stone railing still remains, although it has been prostrated by the weight of the rubbish thrown against it when the stupa was excavated. When I first saw the place only three of the railing pillars near the eastern gate were visible above the ground, but a shallow excavation soon brought to light some pillars of the south gate, from which I obtained the measurement of one quadrant of the circle. I was thus able to determine the diameter of the enclosure, the whole of which was afterwards excavated, partly by myself and partly by my assistant Mr. Beglar. In many places the accumulation of rubbish rose to eight feet in height, and as the stone pillars were lying flat underneath this heap, the amount of excavation was necessarily rather great; but the whole work did not occupy more than six weeks, and all that now exists of this fine railing is now exposed to view.

This colonnade of the *Bharahut* stupa is of the same age and style as that of the great *Sánchi* stupa near *Bhilsa*. But the *Sánchi* railing is quite plain, while the *Bharahut* railing is profusely sculptured,—every pillar and every rail as well as the whole coping being sculptured on both faces, with an inscription on nearly every stone. From the characters of these inscriptions, as in the similar case of the *Sánchi* stupa, the erection of the railing must be assigned to the age of *Asoka*, or about B. C. 250.

The inscriptions are mostly records of the gifts of pillars and rails, like those of the *Sánchi* and other stupas. But there is also a considerable number of descriptive records, or placards, placed either above or below many of the sculptures. These last are extremely valuable, as they will enable us to identify nearly all the principal figures and scenes that are represented in these ancient bas-reliefs.

Amongst the numerous sculptures at *Bharahut* there are no naked figures as at *Sánchi* and at *Mathura*, but all are well clad, and especially the women, whose heads are generally covered with richly-figured cloths, which may be either muslins, or perhaps brocades or shawls. Most of the figures, both male and female, are also profusely adorned with gold and jewelled ornaments, in many of which one of the most significant Buddhist symbols



plays a prominent part. The earrings are mostly of one curious massive pattern which is common to both men and women. The *ankus*, or elephant goad, was also a favourite ornament, which is placed at intervals in the long necklaces of ladies.

At each of the four entrances the corner pillars bore statues, each  $4\frac{1}{2}$  feet in height, of *Yakshas* and *Yakshinis* and of *Nāga Rajas*, to whom the guardianship of the gates was entrusted. Thus at the northern gate there are two male figures and one female, which are respectively labelled *Ajakālaka Yakho*, *Kupiro Yakho*, and *Chaddā Yakhi*, that is, the *Yakshas* named *Ajakālaka* and *Kupira* and the *Yakshini Chandā*. Other *Yakshas* are named *Suviloma*, *Virudaka* and *Gangito*, and a second *Yakshini* is labelled *Yakhini Sudasana*. On two other pillars there are male figures, each with a hood canopy of five snakes' heads and each labelled *Nāga Raja*. These have their arms crossed upon their breasts in an attitude of devotion appropriate to their appearance on a Buddhist building. On two middle pillars there are two female statues respectively labelled *Chukaloka Devatā* and *Sirimā Devatā* whom I take to be goddesses.

Amongst the scenes represented there are upwards of a dozen of the Buddhist legends called *Jātakas*, all of which relate to the former births of Buddha. Luckily these also have their appropriate inscriptions, or descriptive labels, without which I am afraid that their identification would hardly have been possible. Amongst these *Jātakas* are the following :

(1.)—*Hansa Jātaka*, or "Goose-birth," of which the only portion now remaining below the inscription is the expanded tail of a peacock, which must therefore have played some part in the story.

(2.)—*Kinara Jātaka*. The *Kinaras* were a kind of demi-gods. Here two of them, male and female, are represented, with human heads and clad in leaves, standing before some human personage who is seated. The assignment of horses' heads to the *Kinaras* must therefore belong to a later date.

(3.)—*Miga Jātaka*, or the well known legend of the "Deer," in Sanskrit *Mriga*. I call it a deer and not an antelope, as is generally understood, because all the animals in this bas-relief are represented with antlers. The king of Kāsi is seen aiming an arrow at the King of the Deer (Buddha).

(4.)—*Maghā-Deviya Jātakam*, or "Magha Devi-birth," I know nothing of this story.

(5.)—*Yava Majhakiyam Jātakam*. This title means literally the "mean or average amount of food," which was attained by daily increasing the quantity with the waxing moon and decreasing it with the waning moon. I know nothing of the story, but the bas-relief shows a king seated with baskets of grain (?) before him, each bearing a stamp or medallion of a human head. To the left some men are bringing other baskets. Barley (*yava*) would appear to have been the principal food in those days.



(6.)—*Bhisaharaniya Jātaka.* A *rishi* (or sage) is seated in front of his hut, with a man and woman standing before him, and a monkey seated on the ground, who is energetically addressing the sage.

(7.)—*Latwa-Jātaka.*—The “Latwa-bird-birth.”—This legend apparently refers to some story of a bird and an elephant, of which I heard a curious version in Kashmir in 1839. In the bas-relief there is a bee stinging the eye and a bird pecking the head of an elephant, with a frog croaking close by, while the elephant is treading on a nest of young birds. To the right the same (or a similar) bird is sitting on the branch of a tree over an elephant who is running away with his tail between his legs. Near the top the hind half of an elephant is seen rushing down some rocks. In my Kashmiri version an elephant while feeding throws down a nest of young birds into a stream, where they are all drowned. The parent bird seeks the aid of the bees and mosquitoes, who attack the elephant with their stings, and having half blinded him he rushes off towards the stream, and plunging headlong down the rocks is drowned. The fable seems intended to show the power of combination. There can be no doubt that the two legends are substantially the same; and it seems probable that we may find other Buddhist *Jātakas* still preserved in modern legends after the lapse of more than 2,000 years. Perhaps this particular legend may be found in the *Pancha Tantra*.

(8.)—*Vitura punakaya Jātaka.*—I know nothing of this story *Vitura* may perhaps be a mistake for *Vithurá* “a thief.”

Of illustrations of the life of Buddha during his last appearance there are some good examples. The earliest of these is a medallion containing Máya's dream of the white elephant, which is superscribed *Bhagavato Ukdanti*. A second scene belongs to the reign of *Ajāta Satru*, King of Magadha, in the eighth year of whose reign Buddha attained *Nirvāna*. This is labelled—

*Ajātasata Bhagavato vandate.*—Some of the well known assemblies of the Buddhists would also appear to be represented, of which one is called the *Jatila Sabha*, of which I know nothing. A second belongs, I think, to a later period of Buddhist history, about midway between the death of Buddha and the reign of Asoka. This sculpture represents a large assembly and is duly labelled—

*Sudhamma Reva Sabha Bhagavato Chudá Mahá.*—The words *Reva Sabha* I take to mean the assembly or synod which was presided over by the famous Buddhist Priest Revato just 100 years after the death of Buddha, or in B. C. 378.

But the Bharahut sculptures are not confined to the legends and events connected with the career of Buddha, as there is at least one bas-relief which illustrates a famous scene in the life of Rāma. In this sculp-



ture there are only three figures, of which one seated to the left is holding out an arrow towards a male and female who stand before him—the latter being behind the other. These figures are labelled respectively *Rāma* (the rest lost, but most probably *Chandra*), *Janaka Rāja* and *Sitala Devi*. I believe that this is by far the earliest notice that we possess of the great solar hero *Rāma* and his wife.

I look upon the discovery of these curious sculptures as one of the most valuable acquisitions that has yet been made to our knowledge of ancient India. From them we can learn what was the dress of all classes of the people of India during the reign of Asoka, or about three quarters of a century after the death of Alexander the Great. We can see the Queen of India decked out in all her finery, with a flowered shawl or muslin sheet over her head, with massive earrings and elaborate necklaces, and a petticoat reaching to the midleg, which is secured round the waist by a zone of seven strings, as well as by a broad and highly ornamented belt.

Here we can see the soldier with short curly hair, clad in a long jacket, or tunic, which is tied at the waist, and a *dhoti* reaching below the knees, with long boots, ornamented with a tassel in front just like Hessians, and armed with a straight broad sword, of which the scabbard is three inches wide.

Here also we may see the standard-bearer on horseback with a human-headed bird surmounting the pole. Here, too, we can see the king mounted on an elephant escorting a casket of relics. The curious horse-trappings and elephant-housings of the time are given with full and elaborate detail.

Everywhere we may see the peculiar Buddhist symbol which crowns the great stupa at Sānchi used as a favourite ornament. It forms the drop of an earring, the clasp of a necklace, the support of a lamp, the crest of the royal standard, and the decoration of the lady's broad belt and of the soldier's scabbard.

There are also houses of many kinds, and several temples, one of which is labelled *Vijayata pásāde*, or the "Temple of Victory." There are animals of several kinds, as elephants, horses, deer, cows, and monkeys, and a single specimen of a real tapir. There are numerous crocodiles and fishes, and in one sculpture there is a very large fish, which is represented swallowing two boat-loads of men. There is also a great variety of flowers, and several kinds of fruits, amongst which the mangoe is very happily treated.

But perhaps the most curious of the Bharahut sculptures are a few scenes of broad humour, with elephants and monkeys as the only characters. In two of these an elephant has been captured by a band of



monkeys, who have fastened a billet of wood along the inside of his trunk so as to prevent him from moving it. Ropes are fastened to his neck and body, the ends of which are pulled by monkeys, who are walking and dancing in triumphal procession to the sound of shells and cymbals played by other monkeys. The spirit of these scenes is very droll. A third scene represents the monkeys holding a giant by the nose with a pair of pincers, to which is fastened a rope dragged by an elephant. The action and attitudes of the monkeys are very good. The intention of all these designs is exceedingly spirited, but the execution is coarse and weak.

In the short inscriptions on the railing of the Bharahut stupa I find the names of the following places, *Sugana*, or *Srughna*; *Vedisa*, or *Bhilsa*; *Pátaliputra*, or *Patna*; *Kosámbi*, or *Kosam*; *Nandinagarika*, or *Nander*; and *Násika*, or *Násik*; besides a number of unknown places, of which *Asitamasá* is most probably some town on the river *Tamasá* or *Tamas*, the Tons of our maps.

From these inscriptions also I have learned the names of several parts of the Buddhist gateways and railings, one of which is a new word, or at least a new form of word, not to be found in the dictionaries.

On the top of *Lál Pahár*, or the "Red Hill," which overhangs Bharahut, I obtained a rock inscription of one of the great *Kalachuri* Rajas, Nara Sinha Deva, dated in Samvat (Sake) 909. Altogether Mr. Beglar and I have collected about twenty inscriptions of the *Kalachuris*, who took the titles of *Chedindra* and *Chedinarendra*, or "Lord of Chedi," and called the era which they used the *Chedi Samvat* and the *Kalachuri Samvat*.

I have also got an inscription of the great Chalukya Raja Tribhuvana Malla, who began to reign in A. D. 1076 and reigned 51 years. The inscription is dated in Sake 1008, or A. D. 1086, and the place of its discovery, Sitabaldi, confirms the account of his having conducted an expedition across the Narbada.

After leaving Bharahut I visited Kosam on the Jumna, which I have formerly identified with the ancient Kosámbi. I explored the place very minutely, and my three days' search was rewarded by the discovery of several very curious terra-cotta figures, which are certainly as old as the period of Buddhist supremacy, as the common Buddhist symbol forms an ornament, both for males and females, as in the Bharahut sculptures which I have just before described. Unfortunately there are no inscriptions upon them. Some of them were undoubtedly toys. Such are two rams' heads with a hole from side to side for an axle and a hole at right angles behind for the insertion of a pole, so that they might be rolled forward on wheels to butt against each other. Such also are four carts or chariots with similar perforations, and with harnessed oxen represented on the



fronts. One of them has four oxen, the others only two. These I take to be authentic specimens of the ancient Toy-cart, or *Mrichchhakati*, which gave its name to one of the oldest of the Hindu dramas translated by H. H. Wilson.

A. CUNNINGHAM, *Major-General,*  
*Director General of the Archæological Survey of India.*

SIMLA, the 13th April, 1874.

*Bharahut.*—A further examination of the inscriptions, and the receipt of Mr. Beglar's report of the completion of the excavations, have made several very valuable additions to my account of the *Bharahut* sculptures of which I will now give a brief description.

A bas-relief, labelled with the name of *Pasenajita*, shows the well-known King of Kosala in a chariot drawn by four horses proceeding to pay his respects to the Buddhist Wheel symbol, which is appropriately named *Bhagavato dhamma chakam*.

A second bas-relief represents a Nāga Chief kneeling before the Bodhi Tree, attended by a number of Nāga followers. This scene is named *Erapāto Nāga Rāja Bhagavato vandate*, that is, "Erapātra, the Nāga Rāja, worships Buddha."

The following *Jātakas* have also been found by Mr. Beglar: (1) Uda Jātaka, (2) Senchha Jātaka, (3) Birila (read Birāla) Jātaka—(or) Kukuta Jātaka,—(4) Isimibo Jātaka, (5) Nāga Jātaka, and (6) Chhadantiya Jātakam.

A single bas-relief gives a party of female dancers attended by female musicians. The attitudes are the same as at the present day; but the four female dancers are intended for *Apsaras*, as they are separately labelled,—*Alambusa Achhará*, *Subhada Achhará*, *Padumūnati Achhará*, and *Misakosi Achhará*.

There are also representations of five separate Bodhi Trees of as many different Buddhas, which are distinctly labelled as follows:

(1.)—*Bhagavato Vipasino Bodhi*, that is, the Tree of *Vipasyin* or *Vipaswi*, the first of the seven Buddhas.

(2.)—*Bhagavato Kakusadhasa Bodhi*.

(3.)—*Bhagavato Konagamans Bodhi*.

(4.)—*Bhagavato Kasapasa Bodhi*.

(5.)—*Bhagavato Sakamunino Bodhi*.

These last are the four well known Buddhas named *Krakuchhanda*, *Konagamani*, *Kāsyapa*, and *Sākyamuni*.

But by far the most interesting of all Mr. Beglar's discoveries is a bas-relief representing the famous *Jetavana* monastery at Srāvastī. The scene is labelled *Jetavana Anādhapediko dati koti santhatena ketá*, which I



take to mean that "Anáthapedika buys (*ketá*) the Jetavana for certain *kotis* of money." To the left there is a building labelled *Kosambikuti*, a name which has already appeared in my Srávasti inscription. A second building near the top is labelled *Gadhakuti* or *Gandhakuti*. In the foreground there is a cart which has just been unladen, with the pole and yoke tilted upwards, and the bullocks at one side. The story of the purchase of Prince Jeta's garden by Anáthapindika for eighteen *kotis* of *masurans* is told in Hardy's Manual of Buddhism. According to the legend Prince Jeta, not wishing to sell the garden, said that he would not part with it for a less sum than would pave the whole area when the pieces of money (*masurans*) were laid out touching each other. This offer was at once accepted by Anáthapindika, and accordingly the court-yard is represented covered with ornamented squares, which touch each other like the squares of a chess board, but do not break bond as a regular pavement of stones or tiles would do. For this reason I take the squares to represent the squares pieces of old Indian money. Beside the cart there are two figures with pieces in their hands. These I suppose to be Anáthapindika himself and a friend counting out the money. In the middle of the court are two other figures also with square pieces in their hands. These I suppose to be the purchaser's servants who are laying down the coins touching each other. To the left are several persons of rank looking on, whom I take to be Prince Jeta and his friends. The whole scene is very curious ; and when we remember that the bas-relief is as old as the time of Asoka, it does not seem too rash to conclude that we have before us a rude representation of the buildings of the famous Jetavana which were erected by Anáthapindika during the lifetime of Buddha.

One of the new inscriptions discovered by Mr. Beglar is also interesting, as we get the name of a king who must have been a contemporary of Asoka. This record is as follows : "(Gift) of the Prince Vádha Pála, son of Raja Dhanabhuti."

A. CUNNINGHAM, *Major-General,*  
*Director General of the Archæological Survey of India.*

3. *Fourth List of Birds, principally from the Nága Hills and Manipúr, including others from the Khási, Gáro and Tippera Hills.*—By MAJOR H. H. GODWIN-AUSTEN, F. R. G. S., F. Z. S.

This paper will be published in the Journal, Part II.



## LIBRARY.

The following additions have been made to the Library since the meeting held in April last.

*Presentations.*

## \*\*\* Names of Donors in Capitals.

Proceedings of the Institution of Mechanical Engineers, Birmingham, 29th and 30th July, 1873, Cornwall Meeting, Part I.

## THE INSTITUTION.

Proceedings of the Literary and Philosophical Society of Liverpool, No. XXVII.

*Alfred Morgan*.—On Gems and Precious Stones. *E. C. Johnson*.—The Exploration of Moab.

## THE SOCIETY.

Proceedings of the Royal Society, Vol. XXI, No. 147, Vol. XXII, No. 148.

No. 147. *W. N. Hartley*.—On the Optical Properties of a new Chromic Oxalate. *J. N. Lockyer*.—On the Quantitative Analysis of certain Alloys by means of the Spectroscope. *J. N. Lockyer*.—Researches in Spectrum-Analysis in connexion with the Spectrum of the Sun.

No. 148. *Professor J. Thomson*.—A Quantitative Investigation of certain relations between the Gaseous, the Liquid and the Solid States of Water-Substance. *W. Crookes*.—On the action of Heat on Gravitating Masses.

## THE ROYAL SOCIETY OF LONDON.

Proceedings of the Royal Geographical Society, Vol. XVII, Nos. 3, 4, 5. Vol. XVIII, No. 1.

Vol. XVII, No. 3. *Elias*.—Journey through Western Mongolia. *Bower and Goldsmid*.—Memorandum and Notes on the Route from Shahrūd to Astrabad &c. *Shaw*.—Miscellaneous Notes on Eastern Turkistan. *Johnson* and *Montgomerie*.—Meteorological Observations taken at Lé and remarks thereon.

No. 4. *Major-General Sir H. C. Rawlinson*.—President's Address at the Anniversary Meeting.

No. 5. *Wilson*.—Recent Surveys in Sinai and Palestine.

Vol. XVIII, No. 1.—*Moresby*.—Recent discoveries in the South-eastern part of New Guinea. *Gill*.—Three visits to New Guinea. *Elias*.—Captain Prshewalsky's Explorations in Mongolia and Northern Thibet.

## THE ROYAL GEOGRAPHICAL SOCIETY OF LONDON.

The Quarterly Journal of the Geological Society. Vol. XXX, No. 117.

*Lieut. A. W. Stiffe*.—On the Geology of the Mekran Coast.

## THE GEOLOGICAL SOCIETY OF LONDON.

The Journal of the Chemical Society, Nov. and Dec., 1873, Jan., 1874. Dec., 1873. *D. Howard*.—On the Optical Properties of some Modifications of the Cinchona Alkaloids.



January, 1874. *W. J. Russell*.—On the action of Hydrogen on Silver Nitrate.

THE CHEMICAL SOCIETY OF LONDON.

Journal of the Statistical Society, Vol. XXXVI, Part IV, Dec., 1873.

THE STATISTICAL SOCIETY OF LONDON.

Journal of the East India Association, Vol. VII, No. 3.

THE ASSOCIATION.

Hand List of the Edentate, Thick-Skinned and Ruminant Mammals in the British Museum, by Dr. J. E. Gray.

THE BRITISH MUSEUM.

Ocean Highways. January, 1874.

Yemen. *Baron F. von Richthofen*.—Recent attempts to find a direct Trade-Road to South-western China.

THE EDITOR.

Journal Asiatique. Nos. 7, 8, 1873, No. 1, 1874.

1873, No. 7. *M. E. Renan*.—Une nouvelle inscription nabatéenne. *M. T. Gilbert*.—Note sur les sectes dans le Kurdistan.

No. 8. *M. A. Causin de Perceval*.—Notices anecdotiques sur les principaux musiciens Arabes.

1874, No. 1. *M. Dabry de Thiersant*.—De l'insurrection mahométane dans la Chine occidentale. *Garrez*.—Ouvrages publiés par les Parsis de Bombay.

THE ASIATIC SOCIETY OF PARIS.

Bulletin de la Société de Géographie, Février, 1874.

THE GEOGRAPHICAL SOCIETY OF PARIS.

Bulletin de la Société d'Anthropologie de Paris, 1873, Avril et Mai.

THE ANTHROPOLOGICAL SOCIETY OF PARIS.

Zeitschrift der Deutschen Morgenländischen Gesellschaft. Bd XXVII. Heft IV.

*Th. Nöldeke*.—Zwei syrische Lieder auf die Einnahme Jerusalems durch Saladin. *Dr. O. Blau*.—Vergessene punische Glossen. *M. Steinschneider*.—Zu Kalila we-Dimna. *O. Boecklingk*.—Einige Bemerkungen zu den von Th. Aufrecht veröffentlichten Sprüchen aus Čārīgadhārā's Paddhati. *F. Prætorius*.—Unsterblichkeitsglaube und Heiligenverehrung bei den Himjaren. *F. Spiegel*.—Zur Erklärung des Avesta. *Dr. O. Donner*.—Ueber die Wurzelbildung in den Finnisch-Ugrischen Sprachen.

THE GERMAN ORIENTAL SOCIETY, LEIPSIK.

Monatsbericht der Königlich Preussischen Akademie der Wissenschaften zu Berlin, Januar, 1874.

*Stenzler und Weber*.—Über Nilakanṭha's Rösselsprung.

THE ROYAL PRUSSIAN ACADEMY OF SCIENCES, BERLIN.

Bulletin de la Société Impériale des Naturalistes de Moscou, 1873, No. 2.

*Alex. Becker*.—Reise nach Baku, Lencoran, Derbent, Madschalis, Kasum Kent, Achty.

*Fou Victor Motschoulsky*.—Enumeration des nouvelles espèces de Coléoptères rapportés de ses voyages. (describes some Indian species).

THE IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW.



The Unchaste Hindu Widow, Part I, by Prannath Pandit.

THE AUTHOR.

Übersicht der von mir auf Neu-Guinea und den Inseln Jobi, Mysore und Mafoor im Jahre 1873 gesammelten Amphibien von Dr. A. B. Meyer.

THE AUTHOR.

Anthropologische Mittheilungen über die Papuas von Neu-Guinea,—I, Aeusserer physischer Habitus, von Dr. A. B. Meyer.

THE AUTHOR.

A collection of 8 papers by Isaac Lea, LL. D.

Notes on Microscopic Crystals included in some Minerals—Further notes on the same—Descriptions of six new species of Fresh-water Shells—Descriptions of new species of Unionidae, Exotic and of the United States.

THE AUTHOR.

Numismatic and other Antiquarian Illustrations of the Rule of the Sassanians in Persia, A. D. 226 to 652, by E. Thomas.

THE AUTHOR.

Indische Alterthumskunde, von C. Lassen. Bd. 2.

THE AUTHOR.

Catalogus Codicum Orientalium Bibliothecae Academiae Lugduno-Batavae, M. J. De Goeje, Vol. 5.

THE AUTHOR.

The Calcutta Journal of Medicine, 1874, Nos. 1-3.

THE EDITOR.

General Report on the Topographical Surveys of India for 1872-73.

THE SURVEYOR GENERAL OF INDIA.

Report on the Judicial Administration of the Central Provinces for 1873.

THE CHIEF COMMISSIONER OF THE CENTRAL PROVINCES.

Report on the Administration of the North Western Provinces for 1872-73.

THE GOVERNMENT OF THE N. W. PROVINCES.

Selection of Papers regarding the Hill Tracts between Assam and Burmah and on the Upper Brahmaputra.

THE GOVERNMENT OF BENGAL.

Annals of Indian Administration, Parts 1 and 2, 1871-72.

THE GOVERNMENT OF BENGAL.

Report on the Cultivation of Jute, with a map.

THE GOVERNMENT OF BENGAL.

General Report on the Revenue Survey Operations of the Upper and Lower Circles for 1872-73.

THE GOVERNMENT OF INDIA.

Report on the Tribes &c. around the shores of the Persian Gulf, by Lieut.-Col. Pelly.

THE GOVERNMENT OF INDIA.







PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR JUNE, 1874.

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The monthly general meeting of the Society was held on Wednesday, the 3rd instant, at 9 P. M.

Col. H. Hyde, R. E., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table—

1. From Colonel Mowbray Thomson, a Burmese map of the Manipur and Kubbo Valleys, printed on cloth.

2. From E. T. Atkinson, Esq., a set of photographs of the remains existing at Garhwa near Sheorájpúr in the Allahabad district.

The following memorandum accompanied the donation—

The photographs sent herewith represent the sculptures recently discovered at Garhwa near Sheorájpúr in Parganah Bárah of Allahabad. The greater portion were, until recently, covered over with clay and the debris of the temple shown in plate 1. This temple is situated within a fort of which an exterior view is given in plate 18. The site is a depression amongst the low scattered spurs of the Kaimúr hills, which here approach the Jumna, and until a few years ago was surrounded by a thick belt of jungle. On the north and west of the fort there are fine tanks and on the brink of the former, the remains of a ghát of cut stone and in the neighbouring jungles cut stones which appear to have formed parts of some building. The fort itself is of an irregular four-sided form built on a raised platform to which access is obtained by a small doorway and on the west by a small postern gate. Within is an inner fort having only one entrance and originally walled off from the outer enclosure. Some of the pillars forming the inner square of this enclosure are still standing and show a cell-like arrangement resembling a modern Sarái. They are of various devices from plain voluted shafts



to those elaborately carved all over in panels, shown in plate 2. Others resemble the Buddhist railings found at Gya and other places in Bengal. The capitals shown in the same plate and in the view of the colonnade in plate 12, are ornamented with four-armed figures or animals such as an alligator, elephant, or tortoise. The figures of the avatārs of Vishnu shown in plates 4, 13 and 14 were first discovered by Mr. G. Knox, C. S. and are in wonderful preservation. The most interesting, however, is "the bearded Bhar figure" shown in plate 9. This is universally called a Bhar figure, and is in all respects the same as those figured by Sherring in his 'Castes of Benares' except that it has three heads and also wears the *janav* or sacred thread. It would appear to me to represent some Hindu deity, and not to be necessarily connected with the Bhars. They undoubtedly inhabited this neighbourhood in early times, and it is to this fact must be attributed the assignment to them of all buildings of which the history has been lost. The inscriptions on the pillars of the temple mention a Kayastha family as the persons who dedicated a statue of Naráyana in 1199 Samvat (1142 A. D.), but beyond this we know little of the history of the place. There is no local tradition current respecting it, and all I can suggest is, that it must have been one of the forts in the country of Malaki wa Dulaki destroyed by Ulugh Khán in 1248 A. D. The tract ruled over by this prince lay between Kana and Kalinjar, and Garhwa would lie on the easiest road between those places (Dowson's Elliot, II., p. 348). The mutilation of the figures shows that the destruction of the fort and the overthrow of the statues was due to Musalmáns. Since then it has fallen into several hands and been temporarily repaired in places. The position of the hands in the seated figures in the centre of the group in plate 6 and the form of the head-dress of the figure, of which a back view is given in the same plate, and a front view in plate 9, would point to a much earlier date than the twelfth century, to which all the colossal figures must belong.

Since writing the above, I have seen General Cunningham's account of the fort and its sculptures in vol. III., p. 53 of the Archæological Reports. He is in error in supposing that Rajah Siva Prasáda was the first to discover these remains. Garhwa has always been a favourite encamping ground of district officers, and as early as 1863, I myself copied the inscriptions. The greater number of the colossal figures now photographed were for the first time brought to light in 1873. It is intended to have them brought in and deposited in the Allahabad Museum.

E. T. ATKINSON.

*Naini Tál, 21st May, 1874.*

3. From the author, a copy of Report of the Electrical Superintendent, Government Telegraph Department, for 1872-73, by L. Schwendler, Esq.



4. From Sayyid Karámat 'Alí, a copy of Kitáb u uṣul ilalsanah wal-lughát, and a little MS. containing two 'short treatises in Persian on the Lawfulness of Food, and on Muharram ceremonies.

The following gentlemen duly proposed and seconded at the last meeting were balloted for and elected ordinary members—

Sayyid Amir Ali, Esq., Barrister at Law, Calcutta.

V. A. C. Smith, Esq., C. S., Azimghur.

The following are candidates for ballot at the next meeting—

D. M. Gardner, Esq., C. S. (for re-election), proposed by Mr. A. C. Lyall, seconded by Captain J. Waterhouse.

Dr. J. Scully, Medical Officer, Kashgar Political Agency, proposed by Dr. V. Richards, seconded by Mr. J. Wood-Mason.

Captain S. H. Cowan, B. S. C., Revenue Survey Department, proposed by Captain J. Waterhouse, seconded by Mr. J. Wood-Mason.

Captain T. B. Michell, B. S. C., Assistant Commissioner, Gowhatty, proposed by Captain J. Butler, seconded by Mr. J. Wood-Mason.

Dr. George Watt, Hughli College, proposed by Mr. J. Wood-Mason, seconded by Captain J. Waterhouse.

W. G. Molesworth, Esq., C. E., proposed by Mr. E. Gay, seconded by Mr. J. Wood-Mason.

Captain T. Deane, Adjutant Viceroy's Body-Guard, proposed by Colonel Hyde, seconded by Captain Waterhouse.

Colonel H. Drummond, R. E., proposed by Colonel Hyde, seconded by Mr. Schwendler.

Major H. A. Mallock, Government Telegraph Department, proposed by Colonel Hyde, seconded by Mr. Schwendler.

The President reported that the Council recommended that the Rev. Fr. E. Lafont, Colonel D. G. Robinson and Messrs. J. O'Kinealy and V. Ball be elected members of the Physical Science Committee.

The Secretary read the following extract from Mr. Burnell's pamphlet on the best way of making and utilizing copies of Indian Inscriptions, forwarded for the information of the Society by the Government of Madras.

"The first question is, how to make the copies? Many ways have been tried: rubbings by heelball on paper, impressions on linen made by a pad daubed with printing ink, sketch drawings, photographs, etc., etc. Considerable experience\* and a number of experiments have convinced me that

\* Cf. Also the remarks of Prinsep and Mill, and recently of Dr. Bhau Daji, as to the great alterations in the translations required by improved transcripts of inscriptions long known and published. The great objection to photography as a means of reproducing inscriptions consists in the imperfections of the paper used and the difficulty (or impossibility) of managing the light.



all these methods are defective, and that only two ways are really trustworthy—one applicable to inscriptions on stone, and the other to those on metal.

2. "Firstly, for inscriptions on stone, I recommend impressions on stout, unsized paper, such as is now manufactured at Paris for the use of Egyptologists. The inscription must, first of all, be quite cleared of dust, mud, or other obstructions, and this may be best done by a hard clothes-brush. The paper is then to be rapidly but uniformly wetted in a tub of water, and applied to the inscription, and forced into the irregularities by repeated and forcible strokes with a hard brush; an ordinary clothes-brush is as good as any for the purpose. If the stone be clear of dust, the paper adheres, and when dry falls off, forming (if at all well done) a perfect mould of the inscription. Paper large enough to cover most inscriptions is easily to be had; in the case of very large ones, it is necessary to lap over the edges of the sheets, and apply a little gum and water or weak paste to them; and also to prevent those sheets first applied from falling and thus spoiling the rest, a few poles or sticks leaning against the corners in large inscriptions, or the gum used for joining will be found enough. When properly dried, copies made in this way (in French, "*estampages*") may be rolled up or put in blank books without the slightest injury, and even will stand damp. M. Mariette-Bey and Dr. Brugsch both assured me in Egypt last year that they never found this plan fail.

3. "The second process is applicable to inscriptions on plates of metal; I devised it several years ago, and never found it fail. The plate or plates should be carefully cleaned with a dry brush, and the letters occasionally must be cleared out with a blunt graver. The native process of rubbing the plates with acid and then putting them in the fire to loosen the encrustations should never be resorted to, as it invariably injures them fatally. From the cleaned plate an impression (reverse) is to be next taken by passing a roller charged with ink over the plate, and then printing from it as from an ordinary copper plate. From this impression another may be taken by means of an ordinary copper-plate press; and, with a little practice, a perfect facsimile may be thus obtained, the letters being white and the rest of the plate appearing a dark grey. Photozincography and many other methods exist by which '*estampages*' and facsimiles made by the last process may be multiplied to any extent."

Also a letter from the Secretary to the Government of India, Revenue Department, forwarding copies of the following circular of Her Majesty's Commissioners for the London International Exhibition of 1874, and enquiring whether the Society could render any assistance in furtherance of the objects in view.



## LONDON INTERNATIONAL EXHIBITION, 1874.

*The Ethnology and Geography of the British Empire.*

1. Her Majesty's Commissioners have resolved to commence, in connection with the series of International Exhibitions, Permanent Collections which shall illustrate the Ethnology and Geography of the different portions of the British Dominions, and ultimately form a great National Museum of the Empire upon which the sun never sets. They will be arranged for the present in the Galleries of the Royal Albert Hall. Many portions of the Empire are inhabited by Aboriginal Races, most of which are undergoing rapid changes, and some of which are disappearing altogether. These races are fast losing their primitive characteristics and distinguishing traits.

2. The Collections would embrace Life-size and other Figures representing the Aboriginal Inhabitants in their Ordinary and Gala Costumes; Models of their Dwellings; Samples of their Domestic Utensils; Idols; Weapons of War; Boats and Canoes; Agricultural, Musical, and Manufacturing Instruments and Implements; Samples of their Industries, and in general all objects tending to show their present Ethnological position and state of civilisation.

3. It is proposed to receive for the Exhibition of 1874 any suitable Collections, which will be grouped and classified hereafter in their strict Ethnological and Geographical relations. As, however, there is at present great public interest in the various Tribes inhabiting the West Coast of Africa, including the Ashantees, with whom this country is at war, all objects relating to the Ashantees, Fantees, Dahomeys, Houssas and the neighbouring Tribes are especially desired. The Indian Empire, the Eastern Archipelago, and the Islands of the Southern Hemisphere are also able to afford abundant and valuable materials for the proposed Museum, of which it is believed that the nucleus can be formed at once from materials in private Collections.

4. Her Majesty's Commissioners confidently appeal to the Civil, Military, and Naval Officers of the British Service throughout the Queen's Dominions to assist them in these Collections.

5. Her Majesty's Commissioners have secured the services of eminent gentlemen to advise them from time to time in giving effect to these intentions.

It is requested that offers of Gifts and Loans of Objects should be made known at once to the Secretary of Her Majesty's Commissioners, Upper Kensington Gore, London, S. W.



The following papers were read :

1. *On the Portuguese Settlements in India.* By T. W. H. TOLBORT, Esq., C. S.

(*Extracts.*)

The object of the following paper is to describe the present appearance of the Portuguese Settlements in India. Points of historical interest will be chiefly considered ; social and political features will not be dwelt upon.

The existing Portuguese Settlements are Daman, Diú and Goá. We take Daman first, as the easiest of access from Bombay. The territory of Daman is intermixed with British territory and with that of Dharmapúr. This intermixture is due to political events of the 18th century. The neighbouring stations south of Daman were wrested from the Portuguese by the Maráthás about the middle of that century, and from them passed at the downfall of Maráthá power into our possession. On the other hand, in 1780, the territory of Daman was augmented by the detached parganah of Nagar [Haweli] Avelly which the Court of Púná ceded in indemnification for some piratical act against a Portuguese ship. The population of the Daman territory is about 45,000, of whom 1500 are Christians.

A ride of five or six miles from the Daman Road Station on the Bombay and Baroda Railway takes the traveller to the port of Daman itself. The port of Daman is formed by the estuary of a small river generally known as the Daman Ganga, though I believe it also bears the name of Sandalkal. The environs of Daman on the land side are not very cleanly ; the number of pigs roaming at will, and devouring the garbage in their way, indicates the presence of a Portuguese population.

There are two forts at Daman, one on each side of the estuary, each having a small town in its vicinity. The larger fort and town are on the south or Bombay side ; the smaller and more recent on the north or Súrat side. The visitor from the railway arrives on the north side, but as the southern fort is in every respect the more important of the two, we give it precedence in our description. Its shape, though irregular, approaches that of a square, through the middle of which, north and south, runs the main street from the "Porta do Mar" to the "Porta da Terra." The wall is substantially built of stone. The principal bastion, the "Baluarte da Barra," is at the north-west angle, commanding the entrance to the harbour. Below it is a small supplementary outwork constructed, I believe, in 1830. The remaining bastions are San Phelipe, San Domingo, Santiago, San Jorge, Sant Ignacio, San Sebastian (porta da terra), San Martinho, San Miguel, San Francisco, Madre de Deos, back to the "porta do mar" again. A description of Daman, dated 1634, published as an extract in the third volume of the "Chronista de Tissuary" gives a list of the bastions nearly identical with the above. From the description generally we may conclude



that the outline of the two forts at the present day is quite or very nearly the same as it was more than two hundred years ago.

Entering by the *Porta do Mar*, the visitor has on his left the ruins of the ancient church of the monastery of the Franciscans, distinguished by its tall tower and by its numerous tomb stones, half buried in the débris, half hidden by grass and weeds. Beyond this, still keeping to the left or east of the central road, is the ancient church of the Augustine Friars, now used as the barracks. Further on, near the *Porta da Terra*, is the old monastery of the Order of St. John of God, a lay fraternity who devoted themselves to the care of the sick. The building retains the character of a hospital as in earlier days. Opposite this, on the other, *viz.* the western side of the central road, are the Town Hall, the Jail, and the modern Church with its attendant chapel to the Virgin. Returning on the western side, the visitor passes the ruins of the Dominican church and convent, and then those of the Jesuit establishment, the Church of St. Paul, and the Santa Casa de Misericórdia. Of the Jesuit buildings mere traces are left, as their suppression took place at an earlier date than that of the other religious orders.

In front of these ruins, facing the central road, are the Governor's Palace and buildings appertaining to it. These of course are kept in good repair and have undergone modifications suited to modern requirements. The site, however, is the same as in 1634; but we find from Bocarro that at that date the Governor's house, with the church and college of the Jesuits and some other buildings, formed a fortress within the city, surrounded by a brick wall, and that this fortress and wall had been built by the Muhammadans before the Portuguese conquest.

Daman had twenty-seven cannon in 1634, and many, if not most of these, are still on its ramparts, though the *Baluarte da Barra* is the only bastion now garrisoned.

On the land side the fort is protected by a ditch, cut from the sea to a small rivulet or *nálah* flowing into the Daman Ganga. This *nálah*, which is almost dry during the greater part of the year, is crossed by a drawbridge. Beyond the ditch is a *maidán*, leading to the larger of the two native towns of Daman. On it stand a few modern houses, belonging to Portuguese residents, and a deserted chapel, opposite which is a cross. I was told that the besiegers of Daman once came as far as this cross. Probably this tradition refers to the Maráthá attacks in the eighteenth century, though it may have been handed down from the earlier siege by Aurangzib. For an account of the latter see Tavernier, vol. 2, page 124.

We now turn back to the small fort on the north side of the harbour, all the localities hitherto described being on the south side. The small fort is dedicated to St. Jerome. Its wall is somewhat higher than that



of the large fort. In shape it is an irregular quadrilateral, but there are only three bastions, bearing the names of St. Francis Xavier, St. Ignatius, and St. Jerome himself. Bocarro writes of a bastion Santiago, but apparently this is the one now called after St. Ignatius. Immediately over the gateway is a statue of St. Jerome, and on the sides are figures of two giants in bas-relief, looking like Gog and Magog, each with a motto or couplet. There is a church in the small fort for the convenience of the Christians on that side of the harbour. Some old cannon are still on the bastions. I noticed one with an inscription of the time of "Don João Cotigno, Conde do Redondo, Viceroy, 1618." Sr Rivara refers to one of great antiquity, called the St. Catherine, with the following inscription in Latin, "Joanes Vte (Vicente) faciebat, gubernâte Nuno da Cunha, anno 1537."

Below the walls of the small fort, outside, are several good wells. Beyond, is the town, Portuguese and native, of Little Daman.

There are numerous inscriptions in Daman of greater or less antiquity. Eighty-seven of these have been collected by Sr. Rivara in the second volume of the Tissuary. Omitting those of minor interest, for the most part on tombstones, we give a few of the more important.

Over the Porta do Mar is the following :

"Na era de 1593 sendo capitão desta cidade Do Duarte Deça, que foi ho deradeiro que El-Rei Dom Sebastião com ela despachou, foi por ele lançada a primeira pedra neste beluarte S. Francisco, e se fez esta porta."

Over the Palace, or Government House, is the following :

"Conquistada por Martim Affonso en 1528 a 1538." Capitão Mor de Mar. Indic. &c. Reconquistada en 2 de fevereiro de 1559 pelo. Vice-Rei da India Dom Constantino de Bragança.

This inscription is modern, but occupies the place of an older Latin one. Over the Porta da Terra is the following :

"Na era de 1581 sêdo Martim Affonso de Melo capitão desta cidade foi por el defêdida aos capitais do Grâ Mogor que a tiverão de serquo, he se fez na fortificação della parte deste Baluarte Sao Sebastião he se fes 4 quartinas de muro cô dons baluartes de madeira, S. Dº. he S. Mart. he se fes esta porta."

On the front of the small fort are two inscriptions, that to the right commemorating the commencement of the fort.

"Este Forte Sao Jeronimo se começou por ordem de Dom Jeronimo de Azevedo sendo Viso-Rei da India no anno de 1614, e os Administradores da fortificação desta cidade lhe mandarão lavrar esta pedra por agradecimento com suas armas abertas e emtalhadas pera perpetua memoria dos seculos vindouros." And that to the left its completion—

"Este Forte se acabou em tempo de D. Francisco da Gama Conde Al-



mirante sendo a segunda vez Viso-Rei da India no anno de 1627, e os Administradores da fortificação em reconhecimento ao dito Viso-Rei em cujo viso-reinado se fez a mor parte deste Forte, pera defensão do qual mandou de Goa 4 pesas grandes de artilharia, ordenarão que nesta frontaria se entalhassem as suas armas pera eterna memoria." Besides these there are the mottoes of the two giants ; on the left—

Quem por aqui quizer entrar com esta mo ade pagar ; and on the right—  
Que en he men companheiro a vigiamos sem dinheiro.

The numerous epitaphs range from the year 1564 down to modern times.

Leaving Daman we pass to Díú, the most interesting of all the Portuguese settlements after Goá, but the one least known to Englishmen, as it lies so out of the way. The passage from Daman to Díú in a sailing vessel takes on an average three or four days.

The island of Díú lies to the south of Káthiwár. Its length from east to west is about seven miles ; its average width from north to south scarcely a mile. It is separated from the mainland by a narrow arm of the sea, the eastern access to which is easy for ships of considerable burden, while the western access is obstructed by shallows. A portion of the Portuguese territory, including the village of Gogola, lies on the north of the inlet, adjoining the mainland.

The fortress or citadel of Díú, a formidable and imposing structure, is at the extreme east, or north-east point of the island. To the west of this is the town or Praça, including both the European and native quarter, and covering a considerable space of ground. This is also fortified, especially by a long wall yet further to the west, which runs right across the island. The remaining four-fifths of the island beyond this wall consist of a low sandy strip on the north and of porous rock on the south, between the ridges of which are several small plots of fertile soil where Persian wheels are worked and crops are grown, and in some of which palm trees are numerous. Generally, however, the vegetation, though not destitute of verdure, is limited to grass, solanaceous plants, and different species of euphorbias.

A few small hamlets and some detached forts are scattered through the island, but Díú and its suburb Gogola are the only places of any importance.

The fortifications are constructed of stone dug in the island, and the Praça is intersected by the numerous quarries thus excavated. The stone somewhat resembles the laterite of the Malabar coast, but is darker in colour and much stronger in substance.

Three great events have made Díú memorable in the history of Portuguese India ; (1), the death of king Bahádur of Cambay followed by the first siege of Díú in 1537-38. (The Portuguese had built the fortress in 1535.) (2), The second siege of Díú in 1546 ; (3), The sacking of Díú by Arabs from Maskat in 1668. The two former are among the most glorious inci-



dents of Portuguese history, and may be compared, say to the defence of Arkát or to that of Lak'hnaú in the history of British India. The third event was a sad contrast to the two former and with other contemporary disasters marked the decadence of Portuguese power.

Gaspar Correa, who wrote his History about 1561, has preserved a sketch of the fortress of Diú as it was in his days. There have of course been numerous alterations of detail since then, but essentially the appearance of the fortress is much the same.

From the inscriptions it would seem that the bastions of the outer line received their present names and form between 1630 and 1642, but the plan dates from the time of Don João de Castro who, after the second siege, constructed a new line outside the old, to avoid the trouble and delay of clearing away the débris of the bombardment.

Crossing the outer ditch by a permanent bridge and the inner one by a drawbridge, the visitor proceeds for some distance along a causeway; then, turning to the right, he passes through a double gateway into the fortress. Over the gateway is a Latin inscription, commemorating the vow of King John IV, who in his Cortes of 1646 dedicated his kingdom to the Virgin Mary, and swore to maintain the doctrine of her immaculate conception.

There is a similar inscription at the entrance of most Portuguese towns, and one to the same effect, in Portuguese, may be seen in the Museum of the Bombay Asiatic Society.

The gateway and the landing pier are protected on the harbour side by a bastion, called indifferently after St. George and St. Martin. This is one of the oldest in the fortress. It is shown in Correa's sketch, and perhaps existed in some form or other in the fortress as originally constructed by Nuno d'Acunha. It contains two or three very old cannon, one of them with the following inscription: *Nonii da Cunha Presidis jussu conflatum et absolutum an. M. D. xxxiii, Reimon me fecit*, This gun is called the Tiger, and bears a figure and a second inscription in accordance with its name.

The name of St. George seems to have been given to this bastion between the first and the second siege of Diú, for I find no mention of it in the accounts of the first siege, and it bears the following inscription as a testimony to its date. *Este baluarte fez Manoel de Souza de Sepulveda Capitão desta fortaleza, e alargou toda a cava de mar a mar ma is houtro tanto do que estava na Era de 1542 governando a India Martim Afonso de Souza.*

This bastion is mentioned in the accounts of the second siege (1546), Correa speaks of it as the 'bastion of the gateway,' while Freire de Andrada gives it the name of St. George. The name of St. Martin was given afterwards to commemorate the victory gained by D. João de Castro on St. Martin's day, when he marched out of the fortress and put an end to the siege. There is an inscription referring to this victory over the guard-room



near the gateway. Esta casa se fez em louvor de nosso Sôr e do Bemavêturado Samartº. porque em se v dia deshara tou o Gôr Dô Jo  
 de Crastro todo o poder de  
 l-Rei de Câbaia q' tinha cerc  
 ada esta fortaleza e no mes mo dia per força darinas lho tomou a sua  
 nobre cidade e il lha de Dio 1546.

In the centre are the arms of Castro.

Entering the body of the fortress, we find ourselves in a small square with the ruins of a church on the left, the old palace or Government-House and the Prison on the right, and some other Government offices in front.

I believe the church is that of the Misericordia, which appears to have served as the hospital. This was the church in which the Portuguese heard mass and confessed, before marching out to attack the Muhammadans.

All these buildings bear numerous inscriptions, two on the palace, dated 1612 and 1647; two on the ruined church, dated 1542 and 1765; one on the prison, dated 1604; and one in Latin dated 1702 over the gateway, on the inner side.

Turning to the right and passing the palace, we reach the double line of bastions facing the city. Those in the outer line are named respectively after St. Domingo, St. Nicholas, and St. Philip; those in the inner line are called the Round Bastion, Menagem, Cavalleiro, and Santiago. Of these, Santiago is the only name that has come down from the second siege. It is at the end of the ditch towards the open sea. This, then called the Tower of Santiago, was one of the points of attack during the second siege. Below it is a chapel named after the same saint. The chapel has been rebuilt several times, but it occupies the same site as during the siege and appears to be of the same size and form as then. The English turned it into a godown during their occupation of Díú at the beginning of the present century. The Baluarte Cavalleiro is, as its name implies, the highest of the bastions, that on which the flag is hoisted. The present bastion bears date 1636. During the siege, this site was occupied by the bastion of St. Thomas, which was frequently assaulted and for some time held by the enemy. The bastion of St. John, if I understand the narratives aright, must have been somewhere between Cavalleiro and Menagem. It was blown up during the siege by a mine, which caused the death of sixty of the defenders, among whom was Fernando de Castro, one of the sons of the Viceroy.

Menagem appears to occupy the place of the "Torre do lugar da porta," and the round bastion facing the harbour, that of the Baluarte Santiago. This Baluarte Santiago must not be confounded with the tower of Santiago, which we have already described as near the chapel of the same name at the other extremity of the ditch towards the open sea. The above



identification of modern and ancient bastions seems to me justified by the histories of the siege, but it may be open to correction, in some of its details. There are several inscriptions on the different bastions, but some of them seem misplaced. Several are of great antiquity; one of 1545, before the second siege, another commemorating the reconstruction of the fortress by D. João de Castro in 1547, and a third commemorating the restoration of Portuguese independence in 1641. This last is on the bastion of St. Domingos.

Leaving the city side of the fortress at the chapel of Santiago, we pass along the wall facing the open sea. It was here that some of the besiegers entered by stealth while the attention of the besieged was called off by an assault on the bastion of St. Thomas. Beyond this are the ruins of the Cathedral, Correa's sketch represents it with two towers and spires. The next object of interest is the bastion of St. Theresa, with an inscription to the effect that it was constructed in 1652. Below, and in front of this, is the bastion of S. Luzia with the Couraça grande or breastwork beyond it forming the extreme point of the fortress on the east. The bastion of S. Luzia was built in 1650. Near this bastion is another very old cannon, dated 1537 in the time of Nuno da Cunha.

Between S. Luzia and St. George (the bastion with which we started), are the cisterns of the King and Queen, so contrived as to collect all the rain water from the roofs and walls of buildings in the fort. This is important as there are no wells nearer than the city.

We have thus completed the circuit of the fortress, but a few words must be added as to the Forte do Mar. This is a small detached fort, built on a rock in the centre of the harbour, the entry to which it commands. This fort dates from the earliest period of Portuguese occupation. During the first siege of Díu in 1538, when the enemy had a fleet as well as an army at their command, the Forte do Mar was vigorously, but unsuccessfully, attacked, the defence being aided, according to Correa, by the miraculous interposition of St. James. The oldest existing inscription in this little fort is the following;

Sends Aires Falcão capitão desta Fortaleza de Dio mandon acre scentar este baluarte do mar da maneira que esta na era de 1588.

There is another inscription commemorating an alleged victory by Antonis Teles over the Dutch fleet in January, 1638.

On the ground in front of the fortress are some interesting monuments without inscriptions; a tall obelisk, said to mark the spot where Khwájah Zafar was killed during the second siege; a smaller obelisk said to mark where Rúmi Khán, the son and successor of Khwájah Zafar, experienced the same fate, and a cross said to mark the burial place of D. Fernando de Castro. Tradition can scarcely be trusted as to the exact signification of these monu-



ments, but in all probability they do commemorate incidents of the second siege. It appears that the ground in front of the fortress, and also the interior of the fortress itself were formerly encumbered with numerous buildings which were cleared away about the beginning of the 17th century.

At present, the houses of the Portuguese residents, the principal churches and other buildings of European construction are four or five hundred yards from the fortress, between it and the native quarter of the city. The chief churches are those of St. Paul, St. Francis and St. Dominicos. That of St. Paul—apparently the Jesuit establishment,—was founded in 1601. The churches contain numerous epitaphs of deceased Governors, the oldest being that of Luis Falcao who was killed by a musket shot in 1548. This, however, was originally placed in the Church of the Misericordia, within the fort.

Beyond the European quarter is the native town of Díu.

Then comes the great wall, which runs across the island from sea to sea, dividing the town and fortress from the rest of the island. The wall of the fortress runs from sea to sea in the same way, but its length is not more than four or five hundred yards. That of the city wall must be nearly a mile. There is a handsome gateway in the centre, the *Porta do Campo*. Over this is an image of St. Ignatius. The city wall was begun by Aires Teles in 1570. It has numerous bastions and bears many inscriptions, several between 1570 and the end of the 16th century, but more of a later period, the beginning of the 18th century.

Beyond the wall, though within a mile of the city, are two prominent but deserted churches, that of *Nossa Senhora de Remedios*, and that of *Nossa Senhora de Guia*.

Bidding farewell to Díu, we proceed to describe Goá itself, the famed capital of Portuguese India. The best guide to Goá is that written by the Rev. Denis L. Cottineau de Kloguen and dedicated by him to Sir John Malcolm. It was published at Madras in 1831, and a Portuguese translation has been since published at Goá, but copies of the work are now rare whether in English or in Portuguese. Captain Burton devoted some pages of one of his earliest works "*Goa and the Blue Mountains*" to an account of Goá, but this account is somewhat flippant, and gives very little antiquarian information.

The changes since Cottineau's time are not so great as might have been expected. The buildings in Old Goá are mostly of laterite and the damage caused by each year's monsoon must be considerable, still many of the ruins are well preserved.

Three miles up the Goá river is the church of the *Reis Magos*. Beyond this is New Goá, or Panjim, which was an important suburb even in ancient




days, and which supplanted Goá as the capital in 1765. One of its churches, I believe that of N. S. da Conceição, stands on an elevation overlooking the town. It appears to have been built in the beginning of the 17th century, as it contains inscriptions as early as 1654. In the principal square is a statue of Albuquerque. This statue, now black with age, was removed to Panjim from Old Goá in the year 1810. In Pyrard's time (1609), it stood in front of the Church da Serra near that of da Misericórdia. The figure is that of a man rather below middle height, with a long beard, his elbows stretched out, and his hands resting in front.

Two very pleasant excursions may be made from Panjim, besides the visit to ruined Goá. One of these is westward to Cabo, the extreme point of the island, which commands the same view as Aguada, though from a different point. The building at Cabo was formerly a Franciscan monastery. It was founded in 1594, and contains several inscriptions of the 17th century. There are also paintings, one representing the death of a Princess of Portugal, and several pictures of saints.

The other excursion is across Goá Island, in a south-westerly direction to Goá Velha. Goá Velha must not be confounded with the ruins of the Portuguese city, known to us as Old Goá. It is the site of a yet more ancient city occupied by Hindús and Muhammadans in times long prior to Portuguese conquest. Near Goá Velha is another interesting convent, that of N. S. de Pilar. This also belonged originally to the Franciscans, but was afterwards made over to the Carmelites. A Carmelite prior, the solitary survivor of his society, still officiates at this church.

The distance from Panjim to Goa itself is about six miles. The road crosses a bridge built by the Count de Linhares in 1634, and then traverses a causeway, about two miles long, having the shore of the estuary or Rio de Goá on the left and an expanse of marshy meadow land on the right. The causeway was built in 1771. At the end of this causeway is the village or suburb of Ribandar, then that of Pannely and then Goá. Goá, however, provided wind and tide are favourable, is more easily and pleasantly reached from Panjim by water. Supposing the latter course to be adopted, the visitor will probably leave his boat in front of the principal gateway. A road leads from the landing-place through a luxuriant grove of cocoanuts to this gateway, all that remains standing of the Viceroy's palace, founded in the first instance by Albuquerque himself. Over the gateway is a statue of Vasco da Gama, erected by his grandson in 1600. Within the gateway is an inscription, commemorating the enfranchisement of Portugal, and the usual inscription of John IV., dedicating the place to the Virgin, 1646.

On the left of the gateway are the Church and Convent of St. Caetan. This is one of the few churches still kept in good repair. It is a domed





building, more in Italian than Portuguese style. It was built in the middle of the 17th century by the order of the Theatins.

Behind this Church, in low ground, are the ruins of the Dominican Church and Monastery; and very near these, to the south, but on an elevation, are the ruined Church and Monastery of the Carmelites.

The Church and College of St. Paul (the Jesuit establishment) are shown in Cottineau's plan just to the south of the Carmelite Convent, but they were in ruins in his time, and now almost all traces of them seem to have disappeared.

The hospital of St. Lazarus where, says Cottineau, St. Francis Xavier generally passed the night, in order that he might help and serve the sick, was to the east of the Church of St. Paul.

Behind, that is, to the east of the Dominicans and Carmelites is the Church of N. S. dal Monte, a prominent building standing on a hill.

Turning to the other side, westward from the main gateway, we come to the Cathedral, dedicated to St. Catharine, on whose day Goá was taken by Albuquerque. It was founded as the first parochial church soon after the conquest, and it became a Cathedral in 1534. According to Cottineau, it was enlarged and rebuilt in its present state in 1630. It is crowded with epitaphs, mostly of the beginning of the 17th century. Many of these have historical interest. I noticed one to the memory of Gaspar de Leão, first archbishop of Goá, who died in 1578. This was removed to the Cathedral in 1864 from one of the other churches.

In front of the Cathedral, a little to the south, is the site of the Inquisition. Behind the Cathedral and almost contiguous with it are the Monastery and Church of the Franciscans.

Leaving this group of buildings and passing the ruined churches of Misericordia, we reach what was formerly the heart of the city. A few hovels are all that now remains of the bazar.

Near these is the Church of the Bom Jesus, with a spacious house adjoining it. From inscriptions in the church itself, it appears to have been founded for the Jesuits by Mascarenhas, Captain of Cochin and Ormus, who died in 1593. It was consecrated by Archbishop Menezes in 1605, and the body of St. Francis Xavier, which had been originally deposited in the Church of St. Paul, was removed in 1624 to this church, where it still remains, transferred in 1655 from one side of the church to the other.

Over the main altar is a statue of St. Ignatius. There is another statue at the side, in silver, of Xavier himself. At the entrance of the church on the left, exposed in a glass case, is the embalmed body of Saint Paulina, with whose history I am not acquainted. Opposite the chapel in which Xavier's body now lies, in the chapel of St. Francis of Borja, and it was here that Xavier's body was first deposited in 1624.



The chapel at present occupied by the tomb is at one extremity of the transept. The mausoleum itself was presented by a Grand-Duke of Tuscany. It may be said to consist of three stages besides the silver coffin on the top. The lowest stage is of jasper, ornamented with figures of cherubs of Carrara alabaster. The second stage is also of jasper, of various colours, each of the four sides containing a bronze bas-relief, representing a scene in Xavier's life. That on the west, *i. e.*, at the feet of the corpse, represents the saint baptising savages; above it is the motto "*ut vitam habeant.*" The second bronze, on the side of the Church, represents Xavier preaching, and is surmounted by the motto "*Nox inimica fugat.*" The third bronze, on the opposite side to this, represents Xavier fleeing from the savages of the Island of Moro and bears the motto "*Nihil horum vereor.*" The fourth scene at the head of the coffin is that of Xavier's death, and over it are the words "*Major in occasu.*"

Above this is the third stage, built of jasper and other stones of various colours. On this rests the ornamented silver coffin with a cross beneath a rich crimson canopy surmounted by a coronet. The last time that the coffin was opened and the body exhibited, was in 1859. The exposition previous to this was in 1782.

Going westward from the Church of the Bom Jesus we come to another group of buildings, comprising the Nunnery of St. Monica, the Convent and Church of St. John of God, the ruins of the Augustinian Church and Convent and those of the Jesuit College of St. Roc. The Nunnery was founded by Archbishop Menezes in the beginning of the 17th century. It is still habitable though out of repair; only one old nun is left.

The storms of the Malabar coast have made sad havoc with the Augustinian Monastery during the past 46 years, for Cottineau, writing about 1827 describes it in admiring language. But this description no longer applies; the buildings are now in ruins, though a portion of the wall and tower is still the most prominent object in Old Goa, and attests by its loftiness the former grandeur of the fabric.

Tavernier refers to a bitter dispute between the Augustinians and the Jesuits, arising from the construction by the latter of a college close to the convent of the Augustinians and much to their inconvenience. This Jesuit building must have been the college of St. Roc, the site of which is near the Augustinian convent though the building was in ruins even in Cottineau's time. Near this, are the churches of St. Anthony and of the Rosary.

We have now reached the western side of old Goá, where it joins the suburb of Pannelly. Returning by the water's side towards the gateway from which we started, we pass in succession the ruins of the Franciscan College of St. Bonaventure, the Arsenal, and the site of the Aljuvar or Archbishop's prison. There are a few old cannon in the Arsenal and two



or three soldiers appear to be kept on duty there. Over a doorway is the inscription—*Nos autem prædicamus Christum crucifixum.*

In the suburb of Pamelly is a building of some architectural pretensions, but apparently of less antiquity than those previously mentioned, which has served as the Archbishop's Palace. It is now going to ruin.

The Library at Goa is worth a visit. It contains a large number of volumes from the ruined and suppressed convents, though probably it does not contain all that they comprised. A great number of the books are in Spanish or Portuguese, and, as may be supposed, theological and monastic works predominate; though the number of other books is by no means small.

To this account of existing Portuguese settlements we may append a few notes regarding Bassein and Cochin, two places renowned in early Portuguese History, though now held by the English. Bassein bears a general resemblance to Damán. As at Damán, one gate faces an estuary or inlet of the sea, while the other faces the land. The wall of the ancient fortress is still well preserved, and the interior contains the venerable ruins of several ancient churches and monasteries.

The ancient jurisdiction of Bassein (or, as the Portuguese spell it, Baccim) extended as far as Chaul, including Agaçaim, Manora, Asserim, Tana, Bombay, Caranja and Elephanta.

The bastions of the Bassein fortress are thus enumerated by Bocarro (A. D. 1634), Cavalleiro, N. Sa. dos Remedios, Reis Magos, Santiago, Sam Gonçalo, Madre de Deos, Sam João, Elefante, Sam Pedro, Sam Paulo and Sam Sebastião. The number of guns is said to have been eighteen. Four convents are enumerated, *viz.*, those of the Dominicans, the Franciscans, the Augustinians, and the Jesuits. There were two churches within the walls, —the Cathedral and the Misericórdia,—and there were numerous churches in the suburbs.

The author of the *Chronista de Tissuary* visited Bassein fifteen years ago and says—"Almost the whole of the Portuguese wall there is preserved, and in the circuit of the ancient city there still remain several buildings more or less ruined. The gate on the sea side stands perfect with all its nails and ironwork, but there is a modern temple close to the entrance of this gate. In the street which leads from it, on the left, are the ruins of a church, on a stone over the door of which the following inscription is legible. "No anno de 1601 sendo Arcebispo Primaz o Illm<sup>o</sup>. Sr. D. Frei Aleixo de Menezes e Vigario o P<sup>o</sup>. Pedro Galvão Pereira se reformon esta Matriz."

Farther on, at the end of the street which runs along the wall, is a portal which appears to have been the gate of the castle or citadel; on the ground is a fallen pillar with the inscription—"Governando o Estado da India o Vice-Rei Dom Miguel de Noronha, Conde de Linhares se fez este portal, em o qual se poz por padroeiro desta cidade a Sam Francisco Xavier. A des de maio 1631."



Above, on the facing of the portal, and on the right of the spectator, is the following—"Sendo Capitão desta cidade Gaspar de Mello de Miranda e veadores Gonçalo Coelho da Silva, Pero Ferreira, e João Boto Machado cô os mais officiaes se poz neste (portal ?) a Sam Xavier que tomarão por sen patrono.....No anno de 1631."

In the enclosure of the ancient castle is a steam sugar-refinery, which also occupies the ancient church that used to be there, the name of which I could not discover. In the open space in front is a good temple, and at the end of the open space the convent of St. Dominic, the greater part of which is in ruins. The Church, however, is standing, though without a roof; in its principal chapel there is still the tomb of the patron, on the gospel side of the altar, but it has fallen in and the epitaph is destroyed. The church is very large, might be easily restored, and still retains the arch of the principal chapel.

In front of the Refinery above referred to, there is an ancient chapel which serves as a warehouse. The Church of St. Paul, of the Jesuits, is still standing, without a roof, but with the arch of the principal chapel. In it are the following grave-stones and epitaphs: "Sepultura de Isabel de Aguiar, Donna viuva, insigne bemfeitora deste collegio. Falleceo a 24 de Janeiro anno de 1591."

Sepultura de Doña Filipa da Fonseca, Dona viuva, insigne bemfeitora desta igreja a quem en sua vida den tudo quanto tinha. Faleceo a vinte de julho da era de 628.

The façade of the church is a rich structure with Corinthian columns, built entirely of black stone and well preserved. The greater part of the College is standing with its cloisters, &c. In another street, which runs along the wall, there is a modern English tomb, and opposite it an ancient postern, in the wall, above which is the inscription—"Reinando ho muio alto e muito poderoso Rei Dom Joam de Portugal 3 deste nome e governando a India o Vice Rei Dom Afonso de Noronha filho do Marquez de Villa Real, sendo Francisco de Sá capitão desta fortaleza e cidade de Baçai, fundon este baluarte per nome Sam Sebastiam aos 22 dias do mes de fevereiro era 1554 anos."

There is a large church and convent in ruins, which appears to me to be that of the Franciscans. The principal chapel retains its arch and in the centre of its pavement are the remains of a tomb stone "..... e do conselho de Sua Magestade Faleceo em 24 dagosto de 1558 e de sua molher Dona Luiza da Silva e sens erdeiros." In the first chapel on the gospel side of the altar—"Aqui jas Dona Francisca de Miranda, molher de Manoel de Melo Pereira, instituidora desta capella, e sua filha Dona Ines de Melo, e sen neto Luis de Melo, a qual faleceo a 10 de Novembro de 1606.

In the next Chapel.—"S<sup>a</sup> de Dona Giomar Daguiar molher que foi d'Alvaro de Lemos que Deos aja. Faleceo a 4 de março de 96. He sua he de seu filho."



The gateway on the land side is uninjured, but without the wooden gates.

At Cochin the chief relics of Portuguese dominion are, the ruined Cathedral tower, and the building now used as the Protestant Church. The Cathedral, after serving the Dutch as a warehouse, was blown up by the English in 1806. The tower which remained standing after the explosion, now serves as a light-house.

The church in present use was originally dedicated to St. Antony, but formed a part of the Franciscan monastery. It has been renovated two or three times, and in the course of these changes most of the tombstones Portuguese and Dutch, with which it is crowded, have been transposed. There are also several tombstones in other parts of the town.

The volume of the *Chronista de Tissuary* from which we have translated the notes regarding Bassein gives a list of Portuguese inscriptions at Cochin, but they are mostly the epitaphs of private individuals. It is, however, worthy of note that the great Vasco da Gama himself was first buried in the Franciscan Church, now used by the English, at Cochin. His body was subsequently removed to Portugal, but there is a tradition that one of the tombstones in the church, which appears to bear the name of Gama, belonged to his original tomb. This, however, may be a mistake, as we do not find the inscription in the list given by the *Chronista de Tissuary*.

2. *On Earth-Currents.* By L. SCHWENDLER, Esq.

(Abstract.)

Mr. Schwendler said that the phenomenon of earth-currents seemed to be intimately connected with the earth-magnetism and its variations.

He would, however, point out from the beginning that though the two phenomena, "*earth-magnetism*" and "*earth-currents*," were undoubtedly connected with each other, it was by no means established as yet that they were cause and effect, or, what certainly seemed to be far more probable in the present state of knowledge on the subject, parallel effects of *one* and the *same* general but entirely unknown cause.

The three elements of the earth-magnetism, intensity, inclination and declination, had been quantitatively and most accurately determined in almost all civilized parts of the world (Calcutta excepted) by the introduction of Gauss' and Weber's well known system of magnetic measurements, and though the results obtained had been very general and satisfactory, establishing the most interesting facts of diurnal and secular periods of variation in the three magnetic elements, and had also been of direct practical benefit to navigation, still the physical nature of the phenomena had



not been unveiled by these observations. To solve the problem it would seem that quantitative measurements of other phenomena, directly or indirectly connected with it, were required, and it was most fortunate that at least one such phenomenon not only existed but was even susceptible of accurate measurement: he meant the *earth-currents*.

The chances of giving a true physical explanation of any phenomenon, he observed, increased in geometrical progression with the number of phenomena directly or indirectly connected with the one to be explained, supposing that they were all susceptible of accurate measurement.

In this particular case he had to deal with two such parallel phenomena, the magnetism of the earth, quantitatively ascertained for more than 40 years past, and "*earth-currents*," sadly neglected.

He said he was perfectly aware why "*earth-currents*" had not been measured, and then, after mentioning the special purpose of his paper, i. e. not to start a fresh theory of the earth-magnetism with the scanty and imperfect material available, but to lay before the Society some more facts connected with its parallel phenomenon, the earth-currents in the Telegraph lines, which had been quantitatively measured during the last six years in widely different parts of the empire, Ceylon included, he proceeded as follows:

"That it was well known that from time to time Telegraph lines, overland, underground and submarine, were affected by what had been called, 'magnetic storms,' i. e. by very strong currents passing through the wires and overpowering entirely those used for signaling, with which electrical disturbances co-existed magnetic variations far exceeding the limits generally observed when no such electrical disturbances exist, and very often accompanied in the northern (and most likely also the southern) part of the planet by vivid auroras. Now these currents observed in the Telegraph lines were '*earth-currents*.'

"For instance on the 10th November, 1871, and on the 4th February, 1872, earth-currents of considerable strength had been observed in all the lines throughout India, and the submarine cables terminating on its shores. These great electrical disturbances were by no means local, but existed almost simultaneously throughout the earth, shewing us a most interesting feature of our planet.

"The fact of the secular changes of the earth-magnetism occupying such a long period as about 1000 years (the principal magnetic pole moving round the astronomical pole in 1000 years) pointed most probably to a cause external to the planet. If he were allowed to follow his own imagination, he would say, that earth-magnetism, its diurnal and secular variations, auroræ boreales and australes and electrical disturbances, weak or intense, in the planet, were all due to the movement of the earth and of the heavenly



bodies generally. That the great electric convulsions observed from time to time were nothing but the Telegraph signals transmitted from far distant regions to our planet, indicating great physical changes in the universe, long before, if ever, they could be felt by the more rough instruments—light, heat and gravitation—at present the only means by which we recognize our kinship with the outer world.

“It could be, therefore, easily perceived how important it was to investigate such a phenomenon (probably of all the most widely connected) by direct measurements.

“Now if such electrical disturbances only existed by fits and starts, as was the case during magnetic storms, it would be almost hopeless to attempt a general system of measurement. This was, however, fortunately not the case, since these earth-currents, which during magnetic storms became so violent, seemed to exist permanently, only of very feeble strength, and it was on this subject that he would give some observed facts.”

The general outline of the rest of Mr. Schwendler's communication will be best given in extracts from his paper, which will be printed in full in Part II of the Journal.

Mr. Schwendler says:

“The currents observed at all hours of the day and all seasons of the year, in every line throughout India, may be obviously due to many different causes acting separately or conjointly. These currents I have designated “natural currents,” to indicate the fact of their being in the lines without any direct, or at least intentional, human agency. The causes which may produce natural currents in Telegraph lines are:—

1. Galvanic action between the earth plates.
2. Polarization of the earth plates by the signalling currents.
3. Polarization of badly insulated points in the line.
4. Atmospheric electricity.
5. Thermo-electricity.
6. Inductive capacity.
7. Voltaic induction.
8. Earth currents.

The latter must be considered as produced by an actual difference of potentials between the two points of our planet with which the ends of a Telegraph line are in contact.

Surely if these “earth-currents” do permanently exist, and further, if they are strong enough to overpower the others, which are evidently of a much more accidental and less permanent nature, then a large number of quantitative observations, judiciously reduced and conveniently compiled, should at least show the tendency of the general law that governs them in strength and direction, leading perhaps finally to the true explanation of the earth's magnetism and the causes of its variations.



Such were in short my reasonings when in 1868 I was entrusted by Colonel Robinson, the Director General of Telegraphs, with the introduction of a system of testing the lines in India, and, although the practical objects of that system had nothing whatsoever to do with the solution of the problem, yet the fact that in each test measurements had to be made with positive and negative currents (for the very purpose of eliminating the influence of the natural currents) secured all the data necessary for the quantitative determination of the electromotive force in the line, to which the natural current must be considered proportional, involving only a slight additional calculation without any extra observations. To this end the necessary provisions were made and instructions issued; and in this manner more than 10,000 electromotive forces, producing the natural currents in the lines of India, have been calculated from the tests made between 1868 and 1872, and are now at our disposal; and although the results of these numerous observations have not as yet been all analyzed, or even compiled, yet in many special cases, and for limited periods, this has been done, and from these we are justified in stating the following as facts:—

1. All the lines in India are affected by natural currents.
2. From more than 10,000 observations it has been established that the prevailing flow of these currents between any pair of stations is as of a copper current from the east to the west; but which is the true direction, or that of maximum intensity, and further whether there is only one such direction, has not been computed as yet.
3. The strength of the natural current in one and the same line is very variable.
4. The direction of the natural current in one and the same line, though also variable to a certain extent, is, however, far more constant than its strength, and out of a number of observations there is generally a marked preponderance of currents flowing in the same direction.
5. The variation in strength and direction of the natural currents in parallel lines of the same length, is far more uniform than might have been expected, considering the many accidental influences to which long overland lines are exposed.
6. The prevailing direction of the natural current in any line is generally also the direction of the maximum current observed, but this is not the case invariably.

These general facts point to *one* probable conclusion, namely, that "*earth-currents*" do permanently exist in the lines of India, though they are often, and under certain circumstances, even much, obscured by many other causes, of commensurate magnitude, but more unstable and accidental in character.



For example, the two Railway lines between Bombay and Madras, one of which is very perfect in insulation, while the other is quite the reverse, both exhibit a copper current flowing permanently from Madras towards Bombay; and this fact, having been ascertained from a large number of tests, extending over a considerable period, and made from both Madras and Bombay, proves that the cause is a general one with respect to time, and that the method and place of measurement do not influence the direction of the current observed. Further, as one of the wires is used for the through traffic towards Bombay, while the other is used for the through traffic towards Madras, and as both circuits are worked with copper currents, the natural currents, which flow in the same direction in the two wires, certainly cannot be due to the polarization of the earth-plates or of faulty places in the lines. The average electromotive force in these wires is about 4·5 Daniells, and maxima of 15 and 20 Daniells are occasionally reached.

I consider it, therefore, established that "*earth-currents*" do permanently exist in the lines of India, their general drift being from east to west, and that we should be now justified in establishing a special system for the purpose of observing them, according to a uniform plan and with improved test methods."

Mr. Schwendler concluded by saying that, based on the facts above stated, he had proposed to the Council of the Asiatic Society to urge on Government the introduction of a system of measurement of *earth-currents*; that the Council had received the proposal most warmly, and had appointed Colonel Hyde, Mr. R. S. Brough, and himself, to work out a practical system; and that Colonel Robinson, the Director General of Telegraphs, had intimated his kind co-operation in the matter.

The reading of the following papers was postponed.

Note by Colonel E. T. Dalton, C. S. I., on a Picture representing the taking of Palámau by Dáud Khán, Aurangzib's general.

Contributions towards a knowledge of the Burmese Flora. By S. Kurz, Esq.

The receipt of the following communication was announced.

1. Ahom Comparative Letters, No. 2. By J. M. Foster, Esq.



## LIBRARY.

The following additions have been made to the Library since the meeting held in May last.

*Presentations.*

\*\*\* Names of Donors in Capitals.

Proceedings of the Royal Society of London, Vol. XXII, No 150.

*F. A. Abel.*—Contributions to the History of Explosive Agents.—Second memoir.  
*J. Tyndall.*—Experimental Demonstrations of the Stoppage of Sound by partial Reflections in a non-homogeneous Atmosphere. *J. F. Buchanan.*—On the Absorption of Carbonic Acid by Saline Solutions.

## THE SOCIETY.

Proceedings of the Royal Geographical Society of London, Vol. XVIII, No. 11.

*T. D. Forsyth.*—Indian Government Mission to the Atalik-Ghazi. *Bushell.*—Notes of a Journey outside the Great Wall of China. *Phillips.*—Notes on Southern Mangi. *Millingen.*—Notes of a Journey in Yemen.

## THE SOCIETY.

Journal of the Statistical Society of London, Vol. XXXVII, Part I.

*H. Beverley.*—The Census of Bengal.

## THE SOCIETY.

The Numismatic Chronicle and Journal of the Numismatic Society of London, 1873, Part IV.

*M. Hy. Sauvaire.*—A Dinar of Salih Ebn Mirdas of Aleppo. *S. E. L. Poole.*—On the Coins of the Urtukis.

## THE SOCIETY.

Proceedings of the Zoological Society of London, 1873, Parts 1-2.

Part I. *J. S. Bowerbank.*—Report on a Collection of Sponges found at Ceylon by E. W. H. Holdsworth. *E. W. H. Holdsworth.*—Note on the occurrence of *Xenospongia patelliformis*, Gray, on the Coast of Ceylon. *Dr. J. E. Gray.*—Notes on Mud-Tortoises (*Trionyx*, Geoffroy), and on the Skulls of the different kinds. *A. H. Garrod.*—On the Visceral Anatomy of the Sumatran Rhinoceros (*Ceratorhinus Sumatrensis*). *Surgeon-Major F. Day.*—On some new or imperfectly known Fishes of India and Burma. *E. Blyth.*—Exhibition of, and remarks on, some Tiger Skins (*Felis tigris*) from India, Siam and Siberia.

Part II. *G. E. Dobson.*—On Secondary Sexual Characters in the *Chiroptera*. *W. T. Blanford.*—Notes on the Gazelles of India and Persia with Description of a new Species. *H. Bruce.*—A List of the collections of Diurnal *Lepidoptera* made by Mr. Lowe in Borneo with Descriptions of new Species. *R. Swinhoe.*—On a Scaup Duck found in China.

Transactions of the Zoological Society of London, Vol. VIII, Part 6.

*Professor Owen.*—On the Osteology of the *Marsupialia*. On *Dinornis*.

## THE SOCIETY.



Minutes of Proceedings of the Institution of Civil Engineers, Vols. XXXV-VI.

Vol. XXXV. *Col. Greathed*.—Irrigation in Northern India. *J. Milroy*.—Cylindrical Foundations. *W. T. Thornton*.—State Railways of India,

Vol. XXXVI. *J. Head*.—Steam Locomotion on Common Roads.

THE INSTITUTION.

Proceedings of the Institution of Mechanical Engineers, Birmingham. Cornwall Meeting, July 1873, Part II.

THE INSTITUTION.

Proceedings of the Royal Institution of Great Britain, Vol. VII, Parts 1-2.

Part I. *R. H. Scott*.—On recent progress in Weather Knowledge. *Capt. E. D. Lyon*.—On the Mythology and Temples of India.

THE ROYAL INSTITUTION.

Bullétin de la Société de Géographie de Paris, Mars, 1874.

THE SOCIETY.

Bijdragen tot de Taal-land-en Valkenkunde van Nederlandsch Indië, 3rd series, Vol. VII, Parts 3-4 and Vol. VIII, Part 1.

Vol. VII. 3-4. *P. C. Cambier*.—Rapport over Tidoreesch-Halmahera.

Vol. VIII. 1. *A. B. Cohen Stuart*.—Nog iets over de opschriften van Menangkabau op Sumatra. *P. A. Leupe*.—Salomon Sweers, raad van Indie, 1644. *A. J. A. Gerlach*.—Een tweetal bijdragen over het noorden van Sumatra.

THE NETHERLANDS-INDIAN SOCIETY OF SCIENCE.

Monatsbericht der Königlich Preussischen Akademie der Wissenschaften zu Berlin, 1874, Februar.

THE ROYAL PRUSSIAN ACADEMY.

Verhandlungen der Kaiserlich-Königlichen Zoologisch-botanischen Gesellschaft in Wien, Band XXII.

THE I. R. ZOOLOGICAL AND BOTANICAL SOCIETY OF VIENNA.

Catalogus Codicum Latinorum Bibliothecae Regiae Monacensis, Tom. 1, Pars III; Tom. II, Pars II.

THE HUNGARIAN ACADEMY OF SCIENCE.

Proceedings of the Boston Society of Natural History, Vol. XV, Parts 1-2, 1872.

Transactions of the Boston Society of Natural History, Vol. II, Part II, Nos. 2 and 3.

THE SOCIETY.

Memoirs of the American Academy of Arts and Sciences, Vol. IX, Part II.

THE ACADEMY.

Monthly Reports of the Department of Agriculture, for 1871 and 1872.

THE GOVERNMENT OF THE UNITED STATES OF AMERICA.



Smithsonian Contributions to Knowledge, Vol. XVIII.

THE SMITHSONIAN INSTITUTION.

Reports of the Archæological Survey of India for 1871-72, Vol. IV.

*J. D. Beglar.*—Delhi. *A. C. L. Carlleyle.*—Agra.

THE GOVERNMENT OF INDIA.

A Supplementary Catalogue of Sanskrit works in the Sarasvati Bhandaram Library of His Highness the Maharaja of Mysore.

THE GOVERNMENT OF BOMBAY.

Vital Statistics of the Bengal Presidency, Vols. 1-3.

*Dr. J. Bryden.*—Annual returns of the European Army of the Bengal Presidency and of the Jails. Cholera Epidemics of Recent years. Age and Length of Service as affecting the Sickness and Mortality of the European Army.

THE GOVERNMENT OF INDIA.

Report on the Police Administration of the Central Provinces for 1873.

Report on the Judicial Administration (Criminal) of the Central Provinces, for 1873.

THE CHIEF COMMISSIONER OF THE CENTRAL PROVINCES.

Meteorological Observations made at the Magnetic and Meteorological Observatory at Simla during the years 1841-45.

THE GOVERNMENT OF INDIA.

Report on the Revenue Survey Operations of the Lower Provinces 1872-73.

Records of the Geological Survey of India, Vol. VII, Parts I-II.

Part I. *Dr. F. Stoliczka.*—A brief account of the Geological Structure of the Hill-Ranges between the Indus Valley in Ladak and Shah-i-dula, on the Frontier of the Yarkand Territory. *T. W. H. Hughes.*—Notes on the Raw Materials for Iron Smelting in the Raniganj Field. *H. B. Medlicott.*—Note on the Habitat in India of the Elastic Sandstone, or so-called Italocumyte. *F. R. Mallet.*—Geological Notes on Northern Hazáribágh.

Part II. *Dr. F. Stoliczka.*—Geological Notes on the Route traversed by the Yarkand Embassy from Shah-i-dula to Yarkand and Kashgar. *Dr. F. Stoliczka.*—Note regarding the occurrence of Jade in the Karakash Valley on the southern borders of Turkistan. *H. B. Medlicott.*—Coal in the Garo Hills. *V. Ball.*—On the Discovery of a new locality for Copper in the Narbada Valley. *T. W. H. Hughes.*—Petroleum in Assam.

General Report on Public Instruction in Bengal for 1872-73.

THE GOVERNMENT OF BENGAL.

Report of the Chemical Examiner, Panjáb, for 1873.

THE GOVERNMENT OF THE PANJA'B.

Asaland af C. A. Holmboe.

THE AUTHOR.

Report by the Electrical Superintendent, Government Telegraph Department, for 1872-73.

L. SCHWENDLER, Esq.



Photozincographed Specimens of Indian Handwriting in various Vernacular characters, collected in the Agra Dead-Letter Office by the Post-Master-General, N. W. Provinces.

CAPT. J. WATERHOUSE.

Mahágurú-nipáter-para- As'anchávastháya, Kartavyakartá byer Vichára.  
BA'BU RA'JENDRALA'LA MITRA.

Aitihásika-rahasya, Part I, by Rámadása Sena.

THE AUTHOR.

Kitábu uçúl ilalsinah wallughát, by Sayyid Karámat 'Alí, of Jaunpur.

THE AUTHOR.

Two MS. treatises in Persian. "On the Lawfulness of Food" and "On Muharram Ceremonies" by Sayyid Karámat 'Alí.

THE AUTHOR.

The Christian Spectator, Vol. III, Nos. 34 and 35.

THE EDITOR.

Rámáyana, Vol. 5, No. 3, edited by Hemachandra Bhattachárya.

THE EDITOR.

#### *Purchase.*

Wörterbuch zum Rig-Veda von H. Grassman. Lief. 3.

Revue Archéologique, 1874, Février et Mars.

*Le Comte A. de Gobineau.*—Catalogue d'une collection d'intailles Asiatiques (chiefly from Persia and Mesopotamia).

Revue des Deux Mondes, 1874, Mars 1-15, Avril 1.

Mars 1. *H. Blerzy.*—Les révolutions de l'Asie Centrale.

Mars 15. *H. Blerzy.*—Les révolutions de l'Asie Centrale. L'Afghanistan et la Transoxiane.

Revue de Linguistique, Tome 1, fasc. I-II.

Fasc. I. *F. Justi.*—Note sur les mots étrangers en Kurde.

Fasc. II. *L. Adam.*—Grammaire Tongouse. *Van Eijs.*—Le pronom démonstratif Basque.

Fasc. III. *L. Adam.*—Grammaire Tongouse. *J. Vinson.*—Le Verbe Basque. *A. Hovelacque.*—Morale de l'Avesta.

Revue et Magasin de Zoologie, 1874, Nos. 1-2.

No. 1. *Dr. Jousseau.*—Description de quelques nouvelles espèces de coquilles appartenant aux genres *Murex*, *Cyprea* et *Natica*.

Journal des Savants, 1874, Février, Mars.

Février. *A. De Quatrefages.*—Etude sur les Todas.

Mars. *Barthelemy Saint Hilaire.*—L'Outtarakanda.

Comptes Rendus, 1874, Nos. 7-13.

No. 7. *M. M. Dujardin, Beaumetz et Hirne.*—Des propriétés antifermentescibles et antiputrides des solutions d'hydrate de chloral.

No. 8. *M. H. de Parville.*—Sur un nouvel appareil pour euegistrer la direction des nuages.



No. 9.—*M. H. Byasson*.—De l'action du chloral sur l'albumine. *M. Oré*.—De l'anesthésie produite chez l'homme par les injections de chloral dans les veines (suite). Tétanos traumatique traité par les injections. Guérison.

No. 10. *M. A. Hatzfeld*.—Note relative à l'emploi du sulfate de cuivre, comparé au tannate de fer, comme agent conservateur des bois.

No. 11. *M. H. Resal*.—Note sur l'emploi des lames flexibles pour le tracé d'arcs de courbe d'un grand diamètre. *M. Berthelot*.—Sur les hydrates cristallisés de l'acide sulfurique. *P. Secchi*.—Recherches expérimentales conduisant à une détermination de la température du Soleil. *M. Elie de Beaumont*.—Rapport, sur les travaux géodésiques relatifs à la nouvelle détermination de la méridienne de France, fait au nom d'une Commission nommée dans la séance du 16 Décembre, 1872.

No. 13. *M. L. Pasteur*.—Observations verbales au sujet de la communication récente de M. Alph. Guérin sur le rôle pathogénique des ferments dans les maladies chirurgicales. *M. P. Bert*.—Recherches expérimentales sur l'influence que les changements dans la pression barométriques exercent sur les phénomènes de la vie.

The London, Edinburgh and Dublin Philosophical Magazine and Journal of Science, Vol. 47, Nos. 311, 312.

No. 311. *J. Croll*.—On Ocean-Currents.—Part III. On the Physical Cause of Ocean-currents. *F. Chambers*.—On the Diurnal Variations of the Wind and Barometric Pressure at Bombay.

No. 312. *H. Vogel*.—On the Sensibility to Light of Bromide of Silver with respect to the so-called Chemically Inert Colours. *Professor Challis*.—A Theory of the Effects produced by Fog and Vapour in the Atmosphere on the Intensity of Sound.

The Annals and Magazine of Natural History, 1874, March and April.

No. 75. March. *H. B. Brady*.—On a true Carboniferous Nummulite.

No. 76. April. *Dr. J. E. Gray*.—On the Arrangements of Sponges. *E. D. Cope*.—The Succession of Life in North America.

The American Journal of Science and Arts, 1874, February and March.

February. *S. P. Langley*.—On the Minute Structure of the Solar Photosphere. *D. Boboulieff*.—On the Dissipation of Electricity in Gases.

March. *J. Blake*.—On the connection between Isomorphism, Molecular Weight and Physiological Action. *M. Carey Lea*.—On the Influence of Colour upon Reduction by Light. *J. F. Whiteacres*.—On recent Deep-sea Dredging Operations in the Gulf of St. Lawrence.

The Quarterly Journal of Science, 1874, April.

*H. Deacon*.—On the Modern Hypotheses of Atomic Matter and Luminiferous Ether.

The Quarterly Journal of Microscopical Science, No. 54.

*E. Haeckel*.—The Gastræa theory, the Phylogenetic Classification of the Animal Kingdom and the Homology of the Germ-Lamellæ. *Rev. M. J. Berkeley*.—Atmospheric Micrography.

The Westminster Review, 1874, April.

Pangensis. The Development of Psychology.

Stray Feathers, 1873-74.

Conchologia Iconica, Parts 312, 313.

Stomatella, Stomatia, Gena, Solen, Adearbis, Teinostoma, Broderipia.

Exchange.

The Athenæum, February and March 1874.

Nature, Nos. 232-235.



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR JULY, 1874.

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The monthly general meeting of the Society was held on Wednesday, the 1st instant, at 9 o'clock P. M.

Col. H. Hyde, R. E., President, in the chair.

The minutes of the last meeting were read and confirmed.

The receipt of the following presentations was announced—

1. From the Government of Bombay, four cases of books and maps published by the Bombay Government, and other miscellaneous works.

2. From W. B. Martin, Esq., three silver punch coins found in making a relief-work road in Madhupúra.

3. From Captain J. Waterhouse, a set of seven photozincographed plates of sketches of the Nágás, drawn by Lieutenant W. G. Woodthorpe, R. E.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected Ordinary Members—

D. M. Gardner, Esq. (Re-elected.)

Dr. J. Scully.

Captain S. H. Cowan.

Captain T. B. Michell.

Dr. G. Watt.

W. G. Molesworth, Esq., C. E.

Captain T. Deane.

Col. H. Drummond, R. E.

Major H. A. Mallock.

The following are candidates for ballot at the next meeting—

Captain H. C. Marsh, 18th Bengal Cavalry, Barrackpore, proposed by Col. H. Hyde, seconded by Mr. H. Blochmann.

Lieut.-Col. G. A. Searle, D. P. W., Bengal, Irrigation Branch, proposed by Captain J. Waterhouse, seconded by Mr. H. Blochmann.

A. W. Chennell, Esq., Topographical Survey, proposed by Mr. J. Wood-Mason, seconded by Captain J. Waterhouse.

Lieut. R. Wace, R. A., has intimated his desire to withdraw from the Society.



The Council reported that the following stores and equipment for Deep-sea Dredging operations had been received from England.

Iron Dredgers, .....	3
Indian rubber accumulators, .....	30
Sieves, copper wire, set of 4, .....	1
"      "      "      5, .....	1
Globular Basket, copper, .....	1
Scoop, .....	1
Trays, copper guage, .....	2
Coil, copper wire, .....	1
Baskets of stone Jars, (6) .....	12
"      "      (4) .....	6
Microscope, .....	1
Deep sea Thermometers, .....	10
Chemical apparatus, Hydrometer.	

The Council also announced that arrangements had been made for the Library being open on Friday mornings from 7 o'clock A. M., to suit the convenience of those members whose official duties prevented them from visiting the Library during the day-time.

The President then announced to the meeting the sad intelligence of the death of Dr. F. Stoliczka, late Natural History Secretary of the Society, on the return journey from Yarkand. He said—

GENTLEMEN,—With a sorrow-laden heart I rise to announce to you that which the gloom that sits upon us all, tells me is already too well known. Would that it had not been my sad task to tell you that Dr. Stoliczka, our late Secretary, has been taken from among us—let us trust to happier and brighter worlds, surely the reward of such nobility of mind, such singleness of heart, such honesty of purpose, such unselfish devotion of a life to his duty in this wide world, to the advancement of his fellow man.

The loss cannot be his—but to us—to this Society he loved so well; to this Government he served so faithfully; to those of all nations and languages who laboured in the same path, and among whom he was rising as one to guide and to lead, his loss is irreparable.

Of the manner of his death we know nothing; all we learn is, that he died on the other side of Leh on his return with the Expedition from Yarkand which he had joined for the purpose of investigating the geological problem of High Central Asia, a work that had for years been the dream of his life.

Gentlemen, when I look round this table to his accustomed seat, when I call to recollection Dr. Stoliczka, a man among whose friends I felt it an honour to be numbered, when I call to mind all that he did for



this Society and the strength he gave it, I can hardly realize the void his death has caused.

The story of his bright, short life, so sadly in honour ended, is to be told, but at some other time, for my heart is full, sorrow stifles my speech, and all that I can now do is to submit my proposition that this Meeting adjourn in mourning as a tribute of respect for our late Secretary, Dr. Stoliczka.

Mr. Medlicott said—

As a member of the Asiatic Society I join in the tribute of sorrow we collectively pay to the memory of our very distinguished Natural History Secretary. But I may be permitted to add, that as a member of the Geological Survey of India, I have, if possible, still greater cause to lament the untimely fate that has befallen Dr. Stoliczka. To that service his labours for the last twelve years have been chiefly devoted. As Palæontologist to the Geological Survey of India he had, only just before starting with the Mission to Kashgar, completed his voluminous work on the Cretaceous Fauna of Southern India, which will be the chief monument of his great power as a naturalist.

The work he himself had most at heart, his enthusiasm for which has at last cost him his life, was the Geology of the Himalaya. Before coming to this country, he had, as a member of the Geological Survey of Austria, done good work in Alpine geology, and he was naturally tempted to carry on those studies in the greater field of the Himalaya. What we do know of those difficult regions, is principally from his work, accomplished in the summers of 1864 and 1865.

In May of last year, he had made arrangements to visit Vienna, where no doubt he would have met with a worthy reception among men who know how to value scientific work ; but when he heard of the intended Mission to Yarkand, he eagerly volunteered to go as Geologist and Naturalist, giving up without a thought the tempting opportunity of a trip to Europe. He did so too against the advice of some of his best friends, who knew how severely the hardships of mountain travel had told upon him on the occasion of his last visit to Tibet. These fears were alarmingly fulfilled in the dangerous attack he suffered from in crossing the passes in October last. He was able, however, to make good use of his opportunity ; and the latest letters received from himself, gave us much hope that in crossing the mountains at a less trying season, he would return in safety. He wrote in great spirits, expressing his satisfaction at the observations and collections he had been able to make. Those hopes are now for ever gone ; and the materials so exulted over are comparatively lost, without the informing mind of the accomplished observer who gathered them.



The reading of the following papers was postponed—

1. Note on a picture representing the Taking of Palámau by Dáúd Khán, Aurangzib's General. By Col. E. T. Dalton, C. S. I., Commissioner of Chutia Nágpur.

2. Note on Fort Ekdálah, near Panđuah, Máldah District, by E. V. Westmacott, Esq., C. S.

3. Contribution towards a knowledge of the Burmese Flora. By S. Kurz, Esq.

The receipt of the following communication was announced—

Descriptions of nine species of *Alycæinæ*, from Asám and the Nágá Hills. By Major H. H. Godwin-Austen F. R. G. S., F. Z. S.

The meeting was then adjourned.

#### LIBRARY.

The following additions have been made to the Library since the meeting held in June last.

#### *Presentations.*

\*\*\* Names of Donors in Capitals.

Professional Papers on Indian Engineering, May 1874.

*Major E. T. Thackeray*.—Artesian boring at Ambála. *Capt. A. Cunningham*.—Review of paper on Well-Foundations. *Capt. A. Cunningham*.—Reduction of Barometric Readings at High Stations. *W. Bull*.—Bull's Fixed Clay-Cutter. *Major G. P. de P. Falconnet*.—Brick and Tile manufacture at Allahabad. *C. H. G. Jenkinson*.—Designs of Girder Bridges for Metre Railways. *W. H. Price*.—Kurrachee Harbour Works.

THE EDITOR.

The Indian Antiquary, May and June, 1874.

May. *C. E. Kenneth*.—Note on the Sects of the Vaishnavas in the Madras Presidency. *W. F. Sinclair*.—Notes on Castes in the Dekkan. *Professor Ramkrishna Gopal Bhandarkar*.—The Veda in India. *V. N. Narasimmizengar*.—Tonsure of Hindu Widows. *Capt. S. J. Mackenzie*.—Panchanga or Indian Almanac. Report of the Exploration of the Buddhist ruins at Jamalgarhi.

June. *L. Rice*.—Bhadra Bahu and Sravana Belgola. *Dr. Leitner's* Buddhist Sculptures. *M. J. Walkhouse*.—Archæological notes. *Dr. J. Muir*.—Passages expressing religious and moral sentiments from the Mahabharata. *V. Ball*.—Visit to the Andamanese "Home," Port Blair, Andaman Islands.

#### THE GOVERNMENT OF INDIA.

Report on the Judicial Administration of the Central Provinces (Criminal) for 1873-74.

#### THE CHIEF COMMISSIONER OF THE CENTRAL PROVINCES.

##### *Purchase.*

Stray Feathers, Vol. I, and Nos. 1-5 of Vol. II.

Pratna Kamra-Nandini, Vol. VII, No. 1.

##### *Exchange.*

Nature, Nos. 236-239.



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR AUGUST, 1874.

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A meeting of the Society was held on Wednesday, the 5th instant, at 9 o'clock P. M.

Colonel H. Hyde, R. E., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table :—

1. From O. H. Brookes, Esq., a model of a war-canoe from the Nicobar Islands, two pig-sticking spears and three fishing spears, used by the Nicobarese.

2. From Dr. Wise, two photographs, taken by Mr. A. Caddy, of the Rājbarī Mat'h on the left bank of the river Padma, where the old city of Śrīpūr stood.

A lithograph of the temple will be published in Journal, Pt. I, No. 3 for this year.

3. From Whitley Stokes, Esq., a copy of "Ancient Laws of Ireland," Vol. III, and a copy of "Manners and Customs of the Ancient Irish." By E. O'Curry, Vols. I, II, III.

On the motion of the President, a vote of thanks was passed to Mr. Stokes for his frequent contributions to the Library.

4. From the Author, a copy of "L'Islamisme d'après le Coran," by Mons. Garcin de Tassy.

5. From the Supdt., Great Trigonometrical Survey of India, a copy of Synopsis of G. T. Survey Results, Vol. I. Great Indus Series.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members—

Captain H. C. Marsh.

Lieut.-Col. G. A. Searle.\*

A. W. Chennell, Esq.

The following are candidates for ballot at the next meeting—

A. Constable, Esq., proposed by Col. F. W. Stubbs, seconded by Captain J. Waterhouse.

\* Colonel Searle's election has since been cancelled at his own request.



Baboo Bhuggoibutty Churun Mullick, proposed by Hon'ble Maulavi Abdul Latif Khan Bahádur, seconded by Mr. Blochmann.

R. Knight, Esq., Assistant Secretary to the Government of Bengal, proposed by Captain J. Waterhouse, seconded by Mr. Blochmann.

The following gentlemen have intimated their desire to withdraw from the Society—

Col. D. Brown, Moulmein.

E. Buck, Esq., C. S., Naini Tal.

The Secretary read the following report on an extraordinary phenomenon observed at the Nicobars on the 31st May, 1874, communicated by the Home Department.

*Extract from the Proceedings of the Government of India in the Home Department (Port Blair), under date the 8th July, 1874.*

Read the following extract from the Report on the affairs of the settlement of Port Blair and the Nicobars for the month of May, 1874.

"On the 31st of the month, at about 5.30 P. M., an extraordinary phenomenon was observed. The sky at the time was quite clear and the weather fine. I was out sailing in my boat, when suddenly a luminous body darted from the heavens from north to south. When first observed, it was like an ordinary meteor with a long tail. In its progress, it seemed as it were to slide into two distinct meteors attached to each other by the tail of the first thus \*——\*——, and then, after a further rapid progress, it appeared to burst into eight parts, and disappeared from view.

"I have never witnessed so strange a spectacle before, and mention the occurrence here in the hope that it may have been observed in India, and that a more perfect account of it may be forthcoming from some scientific individual."

The President remarked that the phenomenon observed was very similar to a very bright meteor seen in the Panjab some time since; it was however, very remarkable that in the present instance no report had been heard. The meteor must have been extraordinarily bright to have been visible in the afternoon in the month of May.

Mr. Blochmann exhibited a bronze figure found in a compound at Pasháwar, received from Col. Ruggles, XIXth Regt., P. N. I.

The figure represents a lute player. It is unfortunately too oxidised to shew details of face and dress.

The Hon. E. C. Bayley, C. S. I., exhibited a coin of Ghiyás ud-dín A'zam Sháh and made the following remarks upon it:

A few days ago, I had the opportunity of examining a small "trouvaille"



of silver coins discovered recently in the Mudhobani Subdivision of the Tirhut District. They are 36 in number and were chiefly of the Bengal king Jalāl ud-dīn Muhammad, though there were also coins of three other Bengal kings, Sikandar bin Ilyās, Ghiyās ud-dīn A'zam Sháh-bin Sikandar-bin Ilyās and (one coin of) Shiháb ud-dīn Báyzid Sháh. All these coins are of published types and, with one exception, are not remarkable. I, therefore, propose only to trouble the meeting with a few remarks as to that one. This professes to be a coin of Ghiyās ud-dīn A'zam Sháh abovementioned. Now the dates given by the native writers as to this part of Bengal history are very confused, indeed manifestly wrong. It is generally stated that, for example, Ghiyās ud-dīn died in 775, A. H., and it is said that before reigning at all, he was in rebellion against his father, who was eventually killed in resisting him. This latter part of the story is corroborated by the coins which have been found; for we have a parallel series both of father and son which range over a period of no less than four years. But the earliest date with which coins of Ghiyās ud-dīn are stamped, is no less than thirteen years after the alleged date of his death, or 788 A. H., and his father's coins are found with dates ranging up to 792 A. H., after which year a regular series of the coins of Ghiyās ud-dīn only have been found with dates as late as 799. It is also related by the historians that Ghiyās ud-dīn reigned somewhat in excess of 7 years, which would bring his latest date down to 799, or at most 800 A. H., more probably 799.

It is also stated that he was succeeded first by one son Saif ud-dīn, who is stated to have reigned ten years,\* and then by another who is recorded to have had a reign of little more than two years. Accepting these periods and fitting them to the dates obtained from the coins as already noticed, the second son of Ghiyās ud-dīn would probably have ceased to reign in 811 or 812 A. H., probably the latter. The historians go on to say that this monarch was dethroned by an Hindú Rájá of "Bhatauriah," called "Kánis" (which is perhaps "Ganésli"), who is said to have reigned seven years, a term which would bring his reign down to 818.

Hitherto we have had numismatic information by which to test this relation only on three points, *viz.*, the succession of the Hindú Rájá by his son, who was a Muhammadan and reigned under the designation of Jalāl ud-dīn Muhammad, of whose coins a pretty full series has been found with dates from 818 onwards.† This date would accord nearly exactly with the lengths

\* The Riyáz us-saláṭīn quoted by Mr. Blochmann gives somewhat differing periods, but the total is greater; and for this reason, and because the only published dates of Saif ud-dīn's coinage accord better with the other accounts, I prefer the latter. Stewart who knew the Riyáz us-saláṭīn seems to have rejected its authority as to this period.

† His dates found in this "trouvaille" are 818, 819, 822, 823, 824.



of the various reigns as generally stated by the historians. Mr. Blochmann, however, who has paid much attention to the subject, is inclined to assign a somewhat earlier date, *viz.*, 816 as that of the accession of this monarch, which would involve a correction of nearly two years in the total of about nineteen years, which the historians give to the three preceding reigns.

The second piece of evidence is that of a coin of a king styling himself Shiháb ud-dīn Báyzíd Sháh, which has been published by Mr. Blochmann with the dates 812 and 816. History is silent as to this king or as to any one who assumed these titles; possibly he was a pretender, or, as Mr. Blochmann has suggested, he was a puppet king set up by Rájá Kánis, or some other aspirant to power, who virtually reigned in his name; his dates all fall within the probable period of Rájá Kánis's authority. There is one coin, as I have said, in the present batch of Báyzíd Sháh, unfortunately the upper part of the last figure of the date is out of the field of the coin.

The third evidence consists in the coinage of Ghiyās ud-dīn A'zam Shah's elder son, Saif-ud-dīn, whose coins have been published by Mr. Laidlay and by Mr. Blochmann. Only one coin published by the latter has, however, an imperfect date, but as that is a four, it can only stand for 804, A. H.

The coin which I have now laid before the meeting, adds a fourth piece of evidence and professes to be, as already said, a coin of Ghiyās ud-dīn A'zam Sháh. It differs only from the coin figured by Mr. Laidlay as Fig. VI, pl. IV, in Vol. XV of the Society's Journal, in the date, which is remarkable, being very clearly 812. Now, though the histories of this time are demonstrably wrong in the dates they assign to Ghiyās ud-dīn, yet it seems unlikely that the whole of the details which they give should be erroneous; and that his reign exceeded, by some twelve or thirteen years, the length universally attributed to it, or that he should have returned to the throne after it had been certainly occupied by his son Saif ud-dīn, is highly improbable. I do not, therefore, believe that Ghiyās-ud-dīn was alive when this coin was struck; in other words, I believe it to be a posthumous coin, struck by some one else for special reasons in the *name* of Ghiyās ud-dīn.

If so, this is by no means a singular instance of the practice. There is an exactly parallel example, and a contemporary one, too, to be found in the coinage of Delhi, as may be seen from pp. 328 to 330 of Mr. Thomas's 'Chronicles of the Pathan Kings of Delhi,' where it is demonstrated that Daulat Khán Lodí and Khizr Khán struck coins in the name of their deceased predecessors, though with the correct date of the year in which the coins were minted. Mr. Thomas refers to a similar case in the adoption by the East India Company of Sháh 'Álam's coinage, though ultimately the Company contented itself with reproducing the coinage of Sháh 'Álam's nineteenth year.



A more recent and more exactly corresponding example, however, is that of Khán Bahádúr Khán who held the executive authority in Rohilkhand for about a year during the mutiny in 1857-58. He was not strong enough himself to assume the regal position and style, and while the Mughuls and the Mahrattas were both struggling, with fair chances of success, for the supreme power, he feared to offend either by acknowledging the supremacy of the other. He solved the difficulty, as Khizr Khán had done before him, by striking coins of Sháh 'Álam with the proper "julús" year, as if Sháh 'Álam had continued reigning down to that date.

Probably similar motives were at work in Bengal when this coin was struck. The feelings of their supporters would hardly have allowed the reigning sovereigns, whoever they were, expressly to acknowledge the supremacy of Timur and his successors. On the other hand, the dread of the Tartar invaders was evidently great, and the local sovereigns would hardly dare to put forth their pretensions to regal state so prominently as was involved by the striking of coins in their own names.

How strong this feeling of dread was even in Bengal, and down to a much later date, is shown by very curious evidence. A successor of Jalál-ud-dīn Muhammad having been hardly pressed by the ruling king of Jaunpúr applied for his interference to Sháhrukh, the son of Timur, then reigning at Hirát, who in reply sent a peremptory order to the king of Jaunpúr to desist from all interference with the affairs of Bengal. It is recorded that, as a fact, this interference did subsequently cease, and the Bengal king in gratitude sent an embassy with presents to Sháhrukh, who again despatched a return embassy, a fact to which we owe one of the best books of that period, the *Maṭla' us-Sa'dain*, which was written by Sháhrukh's ambassador as a record of the observations made, and information collected, by him during his visit to India.

It may be feared, therefore, that with the possible exception of the coins of some obscure pretender, little information further than that we have already, is likely to be gathered from numismatic sources for the adjustment of the confused period of history occurring between Ghiyās ud-dīn's death and the accession of Jalál ud-dīn Muhammad. No coins of Rájá Kánis or Ganesh have yet been found (unless indeed he himself assumed the title Báyazid Sháh, a supposition hardly consistent with the historical accounts of his reign), and it seems improbable, since his reign was one of fair length and prosperity, that, if these existed, some would not have come to light with the coins of both earlier and later kings, which have been found in considerable numbers.

It is, I think, a fair conjecture that Saif ud-dīn desisted from coining on some threat from Timur (if the date on the coin quoted by Mr. Blochmann is correct, he must have continued coining in his own name long after the



sack of Dillī), or that on his death his successor, none of whose coins have been found, hesitated to set up a mintage of his own and adopted the harmless course of coining in the name of his deceased predecessor. At any rate, Rājā Kānis, or Ganesh, probably followed this policy, and to him or to Ghiyās-ud dīn's second son must probably be ascribed the coin now before our Society.

Mr. Blochmann laid before the meeting his translations and notes to the following readings of inscriptions received from Mr. T. W. Beale, *A'grah*.

#### A'grah.

##### 1.

The following inscription\* is from the shrine of Shaikh 'Alá-uddīn Majzúb, who died in A. H. 953, or A. D. 1546, during the reign of Islām Sháh. His shrine is in the Nái kí Mandí, *A'grah*; it has a small dome with Arabic Inscriptions inside the *gumbuz*, and is supported by eight stone-pillars, on one of which is the following (metre, *short hazaj*)—

علامہ الدین مجذوب و خردمند • کزو گشتے روا مطلوب مرغوب  
 بناگه شد نهان از چشم مردم • چون نورب گرشود از دیده محجوب  
 چو گفتم چیست تاریخ وفاتش • خرد گفتا علاؤ الدین مجذوب

۹۵۳

1. 'Alá-uddīn Majzúb (*i. e.* the attracted, *viz.* by God), the wise, through whom desired objects are fulfilled,

2. Vanished suddenly from the eyes of men, as a ray disappears out of sight.

3. I asked what the date of his death was, and Genius replied 'Aláuddīn i Majzúb.'

There are several tombs in the compound of the Dargáh; for the soil in which a saint reposes, is holy. Among the tombs may be seen those of Hakíms Baqá Khán and Liqá Khán, who died in A. H. 1207 and 1215, respectively (A. D. 1792-93 and 1800).

Regarding 'Alá uddīn himself, *vide* Miftáh ut-tawárikh, p. 155; Khazínat ul-Açfiá, p. 1056; Badáoní III, p. 61; Keene's *Agra Guide*, p. 47; and the Akhbár ul-Akhyár.

'Alá uddīn's contemporary was Mír Rafi'uddīn Muhaddis i Çafawí. His shrine has a dome supported by twelve pillars, and is situated in the Hawelí of Açaf Jáh (Ja'far Beg, *vide* *Áin Translation*, I, p. 411), in Belanganj (Bluntganj), near the Bāns Darwázah, *A'grah*. The place where Rafi' uddīn is buried, is also called Chauk Açaf Jáh; and it thus appears that the Chauk was built round about the shrine.

Rafi' uddīn's Mausoleum bears no inscription.

\* A reading of this inscription has also been received from Mr. E. Atkinson, C. S., N. W. P.



## 2.

The following is the inscription of a tombstone in the vicinity of 'Alamganj, Agra.

مرحومي تار خان ششم ماه رجب سنه ۱۰۱۹ برحمت حق پيوست

The pardoned Tatar Khán joined God's mercy on the 6th Rajab, 1019 (14th October, 1610).

This refers neither to Tatar Khán of Akbar's reign, nor to Tatar Khán Bakáwulbeg of Jahángír's time.

## 3.

On a tombstone in the Muhammadan Burial Ground, west of the Náí kí Mandí is the following (metre, short *hazaj*)—

هزار افسوس از مرگ ابو الفتح • كه داغش يك جهان دردم فزوده  
بباغ عدن از دست شهادت • در رحمت بروي خود كشوده  
چو چشمش خفت تاريخ وفاتش • بگفتا هانفم مظلوم بوده  
۱۰۳۳ سنه ۱۵

1. A thousand times alas! on A bul Fath's death, the sting of which has given me a world of pain.

2. In the garden of Paradise the door of God's mercy opened itself to him, because he was a martyr.

3. When his eye closed, a voice from heaven told me that the date of his death lay in the words '*Mazlúm búdah*,' 'he was a martyr.' 15th Muharram, 1033 [29th October, 1623].

## 4.

A short distance from Agra, on the road to Bhartpúr, is a small building adjoining a mosque. The place is commonly called Sarái Nabí Khán. The mosque was built by Khidmat Khán in 1037, or A. D. 1627-28, and bears the following inscription (*Rubá'i* metre)—

توفيق رفيق گشت خدمت خان را • كريات حق سخاوت خامان را  
تاريخ بنای مسجدش گفت خرد • آباد نمود خانه پزدان را  
۱۰۳۷

1. Heaven favored Khidmat Khán, who obtained as a right the liberality of the court servants (?).

2. Genius expressed the date when his mosque was built (in the words), 'He built a house for God.' A. H. 1037.

In the adjoining small building 'a foot-print of the Prophet,' *Qadam Rasúl*, was shewn. Over its entrance, the following inscription is found (*Rubá'i* metre)—



یا اول	مرآت امید دل حاجت خواهست	یا مالک	این لوح که پیدایه مهر و ماعت	الله اکبر
یا آخر	نقش قدم خاص رسول الله هست	یا دایم	خدمت خان را خدا کرم کرده ز لطف	جل جلاله

1. This tablet, which is an ornament of the sun and the moon, is the mirror of the hopes of the heart\* that wishes to have its pious desires fulfilled.

2. God has in His kindness bestowed favors on Khidmat Khán: this is the figure of the real foot of God's Prophet.

God is great, may His glory shine forth! O Ruler! O Eternal! O First one! O Last one!

We see from the *Tuzuk* (pp. 268, 403, 404) that Khidmat Khán was a eunuch. In the 14th year of Jahángir's reign, he held a command of 550, and 130 horse; and he was present with the emperor, when Mahábat Khán took Jahángir a prisoner.

Khidmat Khán is not to be confounded with Khidmatgár Khán and a Khidmat-parast Khán, two other nobles of Jahángir's reign; nor with the Khidmat Rái (*Ain Translation*, pp. 252).

## 5.

At Naglá Jawáhir, in the vicinity of the former office of the Sadr Diwání and Sadr Board of Revenue, Agra, is the tomb and mosque of Mír 'Abdullah Tirmizí (of Tirmiz, on the Oxus), the poet and well-known calligraphist of Jahángir's reign. He received from the emperor the title of *Mishkin-Qalam*, 'the musk-pen'; as poet he is known under the *nom-de-plume* of Waqfí. His son Muhammad Çálih is also well known as a poet; his assumed name is Kashfí, and two lithographed editions exist of his works.†

Mír 'Abdullah died in 1035, or A. D. 1625-26. The Persian verses on the walls of the largest tomb in the Khusrau Gardens in Alláhábád are by him and were written by him.

The following inscriptions are inside the dome of his Mausoleum at Agra (*metres*, short *Hazaj* and *Muzári*)—

نیم غمگین ازین معنی که میرم \* ازین دار فنا سوی جنان رفت  
بحمد الله که عرفان کرد حاصل \* نه پنداری ز گیتی رایگان رفت  
چو تاریخ وفاتش جستم از دل \* ازین ماتم فغان بر آسمان رفت  
دلم گفتا بصد درد و بصد آه \* ز دنیاے ولی قطب زمان رفت

۱۰۳۵

\* In the Persian verse the *l* of *dil* is to be doubled *ob metrum*—a rare case.

† Vide also Sprenger, Catalogue, p. 456.



1. I am not sorry that my Mír has left this perishable world for Paradise.
2. Praise be to God that he acquired true knowledge; hence do not believe that he left the world in vain.
3. In searching for the date of his death, the wailing cry of my heart rose up to heaven,
4. And my heart said in sorrow and with many an alas, 'A saint, the pole of the period, has left the world.' A. H. 1035.

شیخ زمانه مظهر انوار جاودان • کز خواجگان چشت یکے نشانه بود  
 دریای جود و کان سخا قطب وقت میر • عبدالله آنکه در همه فنها یگانه بود  
 کشفی سوال کرد ز تاریخ رحلتش • هم خود جواب داد که شیخ زمانه بود  
 ۱۰۳۵

1. The Shaikh of the age, the focus of the rays of eternity, who is unrivalled among the saints of the Chishtí order,
2. The ocean of liberality, the mine of generosity, the pole of the period, is Mír 'A b d u l l a h, who stood unsurpassed in all sciences.
3. K a s h f í [his son] asked for the date of his departure, and answered his own question by saying, "He was the Shaikh of the age." A. H. 1035.

On the outside of the mosque is the following inscription (metre, *Khaffif*)—

کشفیا سر بر برین جناب بنه • که ازین باب کس نشد نومید  
 گرد این روضه روز و شب گردان • چرخ با انجم و مه و خورشید  
 سال انعام این مکان شریف • هائے گفت روضه جاوید  
 ۱۰۳۵

1. O K a s h f í, place thy head upon His threshold; for none returns hopeless from His door.
2. Day and night, the heavenly sphere with the stars, the moon, and the sun, revolve about this mausoleum.
3. The date of the completion of this noble structure was expressed by a voice from heaven in the words 'the everlasting Mausoleum.' A. H. 1035.

###### 6.

In Mahallah Hathiápol, Agrah, there is a mosque built in 1068 A. H., or 1657-58, by Khán Daurán Nuçrat Khán, the son of Khán Daurán Nuçrat-jang. The father, who at the time of his death was the first noble of Sháhjahán's court, was murdered near Láhor on the 8th Jumáda I, 1055, or 22nd June, 1645, by a Kashmír Bráhmañ boy, whom Khán Daurán had converted to Islám and put among his servants.

Khán Daurán's name was Khwájah Cábir; he was the son of Khwájah Hiçarí Naqshbandí, who held a mançab during Jahángír's reign.

The *Maáşir ul-Umará* has a lengthy biographical note on Khán Daurán, at the end of which the following passage occurs:



"Sháhjahán gave each of his sons more than the will of the father provided, and yet 60 lák'hs of rupees escheated to the Imperial treasury. Khán Daurán's ancestors being buried in Gwáliár, he, too, was buried there. Khán Daurán was single-minded and zealous in the service of the emperor, and not avaricious. He devoted three watches of the day and one watch of the night to government. His private affairs were looked after by Mír Sayyid Imámá, who treated the tenants with unusual harshness. On the day when the news of Khán Daurán's death reached Burhánpúr, neither sweetmeats nor sugar were left in the shops; for all people distributed sweets as a thankoffering. Most of the best buildings of Burhánpúr\* were erected during Khán Daurán's governorship. Thus Zainábád on the Taptí was built by him; he also erected the saráis between Saronj and Burhánpúr.

His sons Sayyid Muhammad and Sayyid Mahmúd were made Commanders of One Thousand; and the youngest son, 'Abd ul-Ghaní, though only twelve years old, received a mançab of 500.

The second son, Sayyid Mahmúd, received the title of Nuçrat Khán, and afterwards that of Khán Daurán. In the first year of Aurangzib's reign, he held Allahábád, and was in the second year appointed governor of Orísá, where he died in 1078 [A. D. 1667-68].

It is he who built the mosque in Hathiápol, Agrah. Mr. Beale reads one of the two inscriptions† on it as follows (metre, *mutaqárib*)—

بدور شهنشاه شاه جهان • بناکرد مسجد بفردوس (۹) سان  
خوان و جوانمرد فرخنده بخت • پسر خان دوران نصرت خان  
چو تاریخ او جست عظم ز طبع • بگفتا بدین جای فیض و امان

۱۰۶۸

1. During the reign of the emperor Sháhjahán, the mosque was built..... (?)
2. By the young and noble and fortunate Nuçrat Khán, son of the Khán Daurán.
3. When I searched for its date, Genius promptly said, "In this place dwell grace and security." A. H. 1068 [A. D. 1657-58].

#### 7.

In the same place there is another mosque, which has the following inscription on a marble slab (metre, short *hazaj*)—

\* The Central Provinces Gazetteer contains no allusion to Khán Daurán *sub voce* Burhánpúr. *Vide* also article Zainábád. The remark in the Gazetteer (p. 128, l. 11) that Shahnawáz Khán lived the life of a recluse at Burhánpúr is unhistorical; for Shahnawáz died of excessive wine drinking.

† I do not give the second inscription, as Mr. Beale could not obtain a metrical reading.



بدور شاه عالمگیر کز عدل • برفت از دهر کفر و ظلم را نام  
چو گشت این مسجد عالی ز کافور • خود گفتا ضیای عین اسلام

۱۰۸۳

1. During the reign of Sháh 'Alamgír, through whose justice the name of heresy and oppression vanished from the world,

2. This lofty mosque arose through Káfúr, and Genius said, 'The lustre of the eye of Islám.' A. H. 1083 [A. D. 1672-73].

8.

*The Aghar Khán Inscription.*

The following interesting inscription is engraved on a stone at the head of the tomb of Nawáb Aghar Khán (I.) in Kachpura, Agrah, close to Sarái Khwájah. The tomb was erected by Nawáb Aghar's son, seventeen years after the death of his father.

Aghar is the name of a tribe of Turkmáns,\* and Aghar Khán seems to have entered service during Sháhjahán's reign. In the first year of Aurangzib's reign, he accompanied Shaikh Mir and Qaf-shikan Khán who pursued Dará Shikoh to the Indus, and was appointed Faujdár of Bhakkar. Soon after, he served in Bengal and Ásám (Journal, A. S. Society, Bengal, 1872, Pt. I, p. 63). Later, we find him in Kábul, where as Faujdár of Jalálábád he had repeatedly to suppress disturbances (A. H. 1085 and 1086). He especially distinguished himself in a battle fought near Lamghán, where, according to Kháfi Khán, he punished the Afgháns so severely, that he and his Mughul soldiers were feared throughout Kábul, and mothers used to frighten their children with Aghar Khán's name. No less than 1700 heads were sent as trophies to court. The battle of Lamghán itself was celebrated in a poem called the *Agharnámah*. Kháfi Khán gives extracts from the epic (Kháfi Khán, II, p. 214). Near Nang Nihár, Aghar Khán also built a fort, to which he gave the name of Agharábád.

In 1102, or A. D. 1690-91, he was recalled from Kábul, and was killed in the same year by the Játs near Agrah. The inscription, though in several places illegible, gives full particulars, and also shews how insecure the roads then were.

بقاریع سال یک هزار و یکصد و دو از هجرت حضرت علیه الصلوات والتحيات خان  
غفران نشان نواب آغر خان از صوبه كابل بموجب فرمان پادشاه ۰۰۰ (۹) هندوستان

\* The word آغر Aghar is frequently written in MSS. اغر without *madd*; and the editors of our Indian histories generally read اغر, *A'azz*, instead of *Aghar*. Thus in the Society's edition of the 'Alamgirnámah. The same work mentions also frequently a villa near Dilhí, where Aurangzib often resided, of the name of A'azzabád (اعز آباد). I cannot say whether this, too, is a mistake for آغر آباد Agharábád.



روانه شده در مرای جاجپور رسید - دوروز پیشتر مردم قافله ..... به حج رفتند - کفار آنجا بغارت برده اسیر کرده بودند - چون همیشه همت عالی بداد غزا مصروف بتقویت دین میداد المرسلین بود مواری نموده دیهات آن کفار را سوخته بسیار کافران را بجهنم فرستاد - اسیران اسلام را خلاص نموده غزا یافته مرتبه شهادت که عالی مدارج است تلاش کرده کام خود را بشهد شهادت شیوین گردانید • و در سال یکمزار و یکصد و نوزده احقر جز و کل دیده مغل که بخطاب موروثی پدر مخاطب گردیده این لوح را برای یادگار بدستخط خود نوشته گذاشت •

تاریخ شهادت ازین ابیات حاصل میگردد که میر هریادی بلخی گفته بوه اینست چرخ گردون ماند نقش داغ حسرت در میان • حیف ازین دنیای فانی وی دریغا از جهان از برای مید آن شیدا شهید راه حق • لاله داغ ماتم جان در بهار و در خزان (?) یکطرف صدا ..... شهید شیر دل • رفت و با صد داغ آخر آن شجاع نکته دان سال تاریخ شهیدان را خرد بر ما بگفت • دو حروف جیم و ی بیرون شد از باغ جنان بهد شاه عالمگیر پادشاه که شاه عالم پسر کلان او بر تخت هندوستان نشست کشته شد فقط

In the year 1102 A. H. [A. D. 1600-91], the late Nawáb Aghar Khán left Kábul by order of the emperor for Hindústán. When he arrived at Sarái Jáiyú, he heard that, two days before, a caravan of pilgrims for Makkah had been plundered by the infidels there, who had taken the pilgrims prisoners. As he had always devoted his energy to the strengthening of the faith of the Prince of the Prophets, he mounted, and attacked the villages of the robbers, burning their houses and sending many infidels to hell. He also set the Muhammadan prisoners free. Having thus engaged in a war with infidels, he sought to obtain the highest rank that religion can bestow, and sweetened his palate with the honey of martyrdom.

And in the year 1119 A. H. [A. D. 1707], Dídah Mughul, who is contemptible in every way and had received the same title as his father had, erected this stone as a monument and wrote the inscription with his own hand.

The date of [my father's] martyrdom will be found in the following verses by Mír Huwaidá of Balkh—

1. The revolving heaven put on us the mark of sorrow. Oh, how perishable is life here below! Alas, how miserable is the world!

2. For the sake of the Prophet did this enthusiastic martyr of the road of God,..... [unclear]

3.....[unclear] the lion-hearted and brave leave us behind with hundred of sorrows.

4. Genius told me the date when the martyrs died and said, 'Remove the letters *jím* and *be* from 'Bágh i Jahán,' 'the garden of Paradise' [= 1107—5, or 1102 A. H.].

He was killed during the reign of Sháh 'Alamgír Pádisháh, whose eldest son, Sháh 'Alam, now sits on the throne of Hindústán.

It is curious that neither the Maásir i 'Alamgírí, nor the Tazkirah i Saláṭín i Chaghtá, mentions Aghar Khán's death; but Kháfi Khán (II, 394) gives the following details. 'When Aghar Khán came near



*Agrah*, he heard that some Jāts had attacked a caravan and plundered some waggons in its rear, which they carried off together with the women in them. Aghar Khán pursued them, came upon their fort, set the women free, and sent them off, thus saving the honor of their husbands. But his zeal impelled him to go further, and he surrounded the Garh and besieged it. But he was struck by a bullet, and his son-in-law was also killed. Some time before, Khán Jahán Bahádúr Kokultásh had been ordered to punish the Jāts; and although he did everything in his power in trying to destroy Garhí, Sasani, (?) and other places of these infidels, the result did not correspond to his wishes. Hence his Majesty ordered Prince Muhammad Bedárbakht to root out the Jāts. Khán Jahán Bahádúr was sent as governor to Bengal; but before he had reached Bengal, he was deposed and sent to Láhor, and from there he was sent to other provinces, and was thus kept for three or four years running from one province to another. Wherever he went to, he did not enjoy the income of his jágír, and the whole revenue went into the treasury. At last, he was called back to court.

'About this time the order was given [by Aurangzíb] that Hindús without permission should not travel by pálkí or ride on Arab or 'Iráqí horses.'

Aghar Khán's son, Mughul Dídah,\* received the title of his father, and is known as Nawáb Aghar Khán II. He was still alive in 1133 (Kháfi Khán, II, 936.)

9.

The following inscription (metre, *Muzári*) is taken from the tombstone of one Aghá 'Alí at the foot of the rampart of the Fort of *Agrah*, close to the Amr Singh gate and the stone horse.

دردا که در نبرد شد آغا علی شهید • ساغر ز دست ماقی نثر کشیده رفت  
تاریخ رحلتش چو پرسیدم از خرد • مسکن دوام او بهشت برین بگفت  
جمادی الثاني سنه ۱۱۹۹

1. Alas! Aghá 'Alí died a martyr in the fight. The cup fell from the hand of the cupbearer who drew from the nectar of paradise.

2. When I asked for the date of his death, Genius said, 'His mansion is for ever in the highest paradise. 2nd Jumáda II, 1199. [2nd April, 1785.]

10.

*The Walter Reinhardt (Samrú or Sombre) Inscriptions.*

The following Quatrain is found on the gate of a garden laid out by the notorious Walter Reinhardt Samrú, in the vicinity of Sháhganj in *Agrah*.

\* *I. e.* either Mughul-eyed, or one who has a 'single' eye, because *mughul* means simple, single-minded.



باغی که ازان چمن چمن گل خودروست \* از نکبت آن دماغ عالم خوشبوست  
بودیم بفکر سال تاریخ این بنا \* عیسی نفس گفت که باغ سمروست  
سنه ۱۷۶۹ ع

1. This is a garden in which many beds of flowers spontaneously grow, and their fragrance perfumes the world.

2. We were thinking of the date when the garden was laid out, when one who had the spirit of Jesus said, 'It is Samrú's garden.' Anno 1769.

Samrú's tomb is in the Roman Catholic Burial ground at Agrah. The tomb is under a small dome and has the following inscription (metre, long *Ramal*)—

فوت سمرو صاحب آن هر کرد نیکو سرشت \* سینۀ آفاق را در آتش حسرت برشت  
سال تاریخش ز تشریف صیحا بر فلک \* باد صبح گفت از بوی گل باغ بهشت  
ع ۱۷۷۸

1. The death of Samrú Sáhíb, the chief of excellent character, burnt the heart of the land in the fire of regret.\*

2. A morning zephyr said that the date of his death, counting from the heavenly visit of the Messiah, lies in the words, 'the perfume of the rose of the garden of Paradise.' A. D. 1778.

## 11.

In the same place inside the dome fixed in the wall is the following:

اینجا مدفونست خواجه مرتینس ارمنی مقدسی که خود را غلام کریستن  
میگفت و چون صاحب خیر بود هر چه با خود داشت بنذر آن حضرت بفقرا ایثار کرد  
در سنه یک هزار و ششصد و یازده از تولد حضرت عیسی \*

Here lies Khwájah Martínas, the Armenian, the Christian,† who called himself the servant of Christ. As he was benevolent, he gave all he had to the poor in consequence of a vow made to Christ. A. D. 1611.

## 12.

Close to the Amr Singh gate and the stone horse under the rampart of the Agrah fort stands a tomb built like a tower. The following inscription is on it—

*Sacred to the memory of Sitárah Begam, the faithful and affectionate friend and companion of Lieut. Shárp, who died on the 3rd Dec. 1804.*

And below it (metre *Mujtass*)—

قضا ز جام اجل چون ستاره بیگم را \* چشاند ذائقۀ کل من علیها فان  
جلیل مرتبه لفتنۀ شارب عالیجاء \* ازان جمیلۀ معشوقه عشق داشت لجان

\* Literally, 'roasted the heart of the horizon in the fire of regret.' Mr. Beale's reading has شمرو Shamrú, not Samrú.

† *Muqaddas*. Perhaps 'a Christian.'



بسے ز مردنش افسوس خورد و کرد بنا \* منارے کہ بود یادگار از جانان  
 بگفت هاتف عیسی نفس پی تاریخ \* ستارے فلك حسن و ناز گشت نهان  
 سنہ ۱۸۰۴

1. Fate gave Sitarah Begam the cup of death to drink, "of which all who are in this perishable world have to taste" [Qorán].
2. Lieutenant Sharp, of high rank, the distinguished, loved this beautiful beloved from his soul.
3. He was much afflicted by her death, and built a tower in memory of the beloved.
4. A voice from heaven, inspired by the Messiah, said, "The date of her death lies in the words 'The star (*sitárah*) of beauty's heaven has set.' " A. D. 1804.

## 13.

*Colonel J. Hessing's Tomb.*

Col. Hessing's tomb in the Roman Catholic Burial ground, Agra, is of white marble. He died a few months before the capture of Agra by Lord Lake. The following inscription, on a slab of slate, is fixed over the tomb.

Sacred to the memory of  
 John William Hessing  
 Late Colonel in the service of  
 Maharajah Dowlut Rao Sindiah  
 Who after sustaining a lingering and very painful illness  
 For many years with a true Christian fortitude and resignation  
 Departed this life 21st July 1803  
 Aged 55 years 11 months and 5 days.  
 As a tribute of their affection and regard  
 This Monument is erected to his beloved Memory  
 By his disconsolate widow Ann Hessing  
 And his afflicted sons and daughters, George William Hessing,  
 Thomas William Hessing, and Magdalen Sutherland  
 He was a Native of Utrecht in Holland  
 And came out to Ceylon in the Military Service  
 Of the Dutch E. I. Company in the year 1752  
 And was present at the taking of Candy by their troops  
 Five years afterwards he returned to Holland  
 And came out again to India in the year 1765  
 And served under the Nizam of the Deccan  
 In the year 1784 he entered into the service of Madarow Sindiah  
 And was engaged in the several Battles  
 That led to the aggrandizement of that Chief,  
 And wherein he signalized himself so by his Bravery  
 As to gain the esteem and approbation of his employer  
 More particularly at the battle of Bhondagown  
 Near Agra in the year 1787  
 Which took place between this chief



And Nawaub Ishmael Beg  
 When he then a Captain was severely wounded  
 On the death of Madarow Sindiah in 1793  
 He continued under his successor Dowlut Rao Sindiah  
 And in 1798 he attained to the Rank of Colonel  
 And immediately after to the Command  
 Of Fort and City of Agra,  
 And which he held to his death.

PHILLIP HUNT, *sept. Calcutta.*

Over the entrance is the following *tárikh* in Persian (metre, *Muzá'irí* i *Akhrab*)—

کز نیل جان ولیم هیسنگ چون ز دنیا • رحلت نمود بنهاد صد داغ از جدائی  
 ذاتش بود هلندیز پیدایش آن ولایت • در هند نامور شد از فضل کبریائی  
 گفتا بملم غیب یک قطعه گو ز تاریخ • تا روز و سال و مقرر یکجا بهم نمائی  
 چون روز و سال و مقرر از سال عیسوی جست • ملمم بگفت تاریخ بسته یکم جولائی  
 سنه ۱۸۰۳

1. When Colonel John William Hensing departed from this world, he left many sorrowing for his absence.

2. By race he was from Holland and was born in that country. In India he became through the kindness of the Almighty famous.

3. The poet asked the inspiring genius of the unseen world to favour him with a *tárikh*, which was to contain the year, the month, and the day.

4. When he searched for a date according to the Christian era, the inspiring genius said, 'The date is the 21st July [1803].'

#### 14.

Going towards Fathpúr Sikrí from Ágrah, we meet on the way, near the village of Suchitia, commonly called Bhondagáon, the mausoleum of one 'Abdurrahmán Sulṭání, who it appears was killed in Zil-Hijjah, 988 A. H., or January, 1581, A. D., during the reign of Akbar, in a battle fought with the Ráná at Konbhalner.

Nothing else seems to be known of 'Abdurrahmán. I have not found his name in the Akbarnámah. The Persian verses on his tomb, however, are superior to similar productions. There are three poems (metres *Khafif*, *Mutaqárib*, and *Rubá'í metre*, respectively), as follows:—

بسم الله الرحمن الرحيم

آه ازین چرخ بیوفا که ازو • کار مردم همیشه حیرانیست  
 هیچ کس را دل نکرده آباد • با همه در مقام ویرانیست  
 عبد رحمن هزار پیشه رزم • آنکه او را خطاب ملطانیست  
 جنگ با کافران غربی داشت • بسکه او را غم مسلمانیست



از قضای زمانه گشت شهید \* چاره نتوان چو حکم یزدان نیست  
 جا بخاوت سرای عقید ساخت \* زین سرای که عالم فانیست  
 حیف ازان فتح بیکرانۀ جود \* که چنین زیر خاک پنهان نیست  
 در غم این یگانۀ آفاق \* کار جمعی بصد پریشان نیست  
 روز و شب زار زار میگیرند \* گر همه سندی و خراسان نیست  
 گر بقریان شهید شد چه عجب \* قوچکار از برای قربان نیست  
 سال تاریخ ازو چو دل پرسید \* آنکه او را سر بخندان نیست  
 در جواب سوال او گفتم \* عبد رحمان شهید ربان نیست

1. Alas, how faithless is fate! It always throws the doings of mankind into confusion.

2. Fate has made the heart of no man happy; with all men it dwells in the place of desolation.

3. 'Abdurrahmán, a lion in war, who had the title of Sultání,

4. Engaged in battle the infidels of the western districts, because he had a heart that feels for Islám.

5. According to the decree of fate, he has now become a martyr; there is no help for it, for it is the will of the Almighty.

6. When he left the caravanserai of this perishable world, he made room for himself in a retired spot of Paradise.

7. Woe to the endless victory of generosity, that such a man should now be hidden by the earth,

8. And that in the loss of this man, who was unrivalled in the world, success should be mingled with so much affliction!

9. If all India and Khurásán weep day and night in sorrow over him, it is no wonder;

10. Nor is it strange that he fell a martyr on the Feast of Sacrifice; for the ram is made to be sacrificed.

11. When my heart asked him for a *tárikh*, him who excels in speech,

12. He gave me as answer to my question the words 'Abdurrahmán is the martyr of God.' A. H. 988.

ز تقدیر حق گشته آخر شهید \* ز دنیای فانی بعقباً شده  
 ندارد غم این جهان آن شهید \* که جایش بفردوس اعلی شده  
 خرد بهر تاریخ او این بگفت \* چو او را شهادت نمنا شده  
 نهان کن ده و دوز محصل او \* یکی از شهیدان برعنا شده  
 چو باکافران بهر دین کرده رزم \* نکو نام در دین و دنیا شده  
 شده مایه قربان چنین واقعه \* شب جمعه این اتفاقا شده  
 خداوند رحمان برو کرده رحم \* که جا در جنازش مهیا شده  
 بضاعت نیاورده الا امید \* خدایا ز رحمت مکن نا امید



1. Through God's will he became at last a martyr, and left the perishable world for the life to come.
2. Being a martyr, he does not grieve for this world; for he has obtained a place in the highest paradise.
3. And because it was his wish to become a martyr, Genius said, "For the sake of a *táríkḥ*
4. Take twelve from the words "one of the martyrs\* killed by the Ra'ná."
5. He fought with the infidels for the sake of religion, and thus gained a good name in religion and on earth.
6. This event took place in the month of the Sacrifice [Zil Hijj], on the night of preceding Friday did it happen.
7. God in His mercy has been good to him, and a place has been prepared for him in Paradise.

He brought no stock besides his hopes. O God, in Thy mercy, do not render him hopeless!

آن دل که درین سراچه فانی شد \* کاخر نه برون بصد پشیمانی شد  
 بس نخل که داه بار جمعیت دل \* و ز باد فنا برگ پریشانی شد  
 آن غازی نامور که در کنبه لایر \* از بهر غزا بحکم یزدانی شد  
 هنگام جهاد بسکه دستان نمود \* از غایت نام رستم ثانی شد  
 نیت چوغزاش بود تاریخ قضا \* عبد الرحمن شهید ربانی شد  
 زو بسکه بدید تیغ رانی رانا \* رانا ز نهیب تیغ او رانی شد  
 چون روز ازل سرشته رحمت بود \* مستوجب فیض فضل رحمانی شد  
 طینت چو خاک داشت آن گوهر پاک \* در زیر زمین چو گوهر کانی شد

1. He was a man whose heart entered this perishable caravanserai, but left it again without feelings of regret.
2. Many a date palm there is that produces pleasant fruit, and yet the wind of destruction scatters its leaves.

\* This *táríkḥ* is unclear.

Instead of Rana (رنا) the verse has رنا *ra'ná*, 'a soft and silly woman.' Mr. Beale says that Akbar gave the Ráná of Udaipur this nickname.

Ra'ná occurs also as the name of towns; thus Baḡrah is often called 'Al-Ra'ná,' and the *Áin i Akbari* gives a parganah of the name of Barodah Ra'ná under Sirkár Nárnaul (N. W. of Āgrah).

The Ráná alluded to is Ráná Partáb, generally called Ráná Kíká, whom Mán Singh had in 984 defeated in the great battle of Gogandah, N. W. of Udaipur. In 986, Shahbáz Khán Kambú (*Áin Translation*, p. 400) had wrested Fort Kōḡbhal-mír (or Kōḡbhal-ner), north of Gogandah, from the Ráná; and in 988, Shahbáz Khán was again sent to Ajmír. "In consequence of his zeal and activity, Ráná Partáb wandered about on the field of destruction, looking upon every morning as his last day. Many rebels were killed and their property was destroyed; and when the district was cleared, garrisons were distributed over it." *Akbarnámah*, III, 283. *Vide* also Dowson, V, 419.



3. He was the famous hero, who at Konhalner\* waged a religious war by God's order.
4. At the time of the war, inasmuch as he planned stratagems (*dastán*), he became through his fame a second Rustam.†
5. To fight the infidels was his intention, and the date of his death was "Abdurrahmán is the martyr of God." A. H. 988.
6. Indeed, the Ráná experienced through him what sword practice is: the Ráná ran a runaway from the terror of his sword.‡
7. When in the beginning the fate of men was settled, God's mercy fell to his share, and he received the blessing of God's favor.
8. But as his body was of earth, his pure frame lies now below the ground, like the jewel of the mine.

## 15.

A rather poetical inscription in Ṭughrá is found on a tombstone in the old Burial-Ground, Agrah. One Abul Fattáh, son of Bábarí Sultán, died on the 13th Shawwál, 978 (A. D. 1571). The people of Agrah say that Abul Fattáh was the son of Akbar's father-in-law (?). A rubbing of the inscription was received in 1871 from Mr. A. Carlleyle (Proc., A. S. Bengal, June, 1871, p. 127).

The words of the inscription are the words of the sorrowing father (metre, *Rubá'í*)—

ای شمع دو دید؟ جهان افروزم • رفتی وز فرقت تو شب شد روزم  
گویا دو شمع بهم من و تو بودیم • گایام ترا بکشت و من میسوزم  
کاتب عبد الهادی

بنارنج سیزدهم ماه شوال سنه نهصد و هفتاد و هشت مرحومی مغفوری ابو الفتح  
بن بابری سلطان در آغاز جوانی ازین عالم فانی برحمت حق پیوست •

1. Light of my eyes! Thou once didst brighten the world.  
Thou art gone, and in thy absence my day has turned into night.
2. We were once as if two lights, when I and thou were together;  
But Fate has extinguished thine, and I now burn in sorrow.

Written by 'Abdul Hádí. On the 13th Shawwál, 978, Abul Fattáh, son of Bábarí Sultán, now received in God's mercy and pardoned, left in the beginning of his youth this perishable world, in order to join the mercy seat of God.

\* Mr. Beale gives کنیلنر and says that he was doubtful what the word was. I have substituted کنیلنیر *Konhalner*.

† An allusion to Dastán, the wily father of Rustam.

‡ I have tried to imitate the alliteration in the text.



**Fathpur Si'kri'.**

The village of *Sí k r í* was called *F a t h p ú r* by Akbar in memory of his conquest of Gujarát.

1.

The High Gate, or 'Baland Darwázah,' in front of Akbar's Masjid at Fathpúr Sikrí was built in 983 A. H., or A. D. 1575, as appears from the *tárikh* (metre, *Mutaqárib*)—

شده رشك طاق سپهر بلند

It rivals the portico of the high heaven.

It bears the following Arabic and Persian inscription—

قال عيسى عليه السلام الدنيا قنطرة فاعبروها ولا تعمروها - فى الاخبار من تأمل  
انه يعيش غدا تأمل انه يعيش ابدًا - وقيل الدنيا ساعة فاجعلها طاعة - بقية العمر  
لا قيمة لها - فى الاخبار من قام الى الصلوة وليس معه قلبه فانه لا يزيد من الله  
الا بعدا - خير المال ما انفق في سبيل الله - بيع الدنيا بالآخرة يربح - الفقير ملك فيها  
محاسبة ۱۱

نامي چه شد ارتو مسجد گاهي كردي \* در قصر زر اندوده پناهي كردي  
خويي جهان بصورت آينه دان \* خود گيروتوهم دروگاهي كردي  
قايله و كاتبه محمد معصوم نامي بن سيد صفاي الترمزي اصلا والبكري سكني  
و المنتسب الي سيد شير قلندر بن بابا حسن ابدال السبزواري مولدا و  
القندهاري موطنًا \*

Jesus,—upon whom be peace!—said, 'The world is a bridge; pass over it and do not cultivate it.' It is written in the Hadís, 'He who thinks that he will live to-morrow, may as well think that he will live for ever.' The world is called a moment; therefore make it an act of worship. The remainder of one's life has no value. It is also said in the Hadís, 'He who comes to prayer and his heart is not with him, will only increase his distance from God.' 'The best property is what is spent on the road of God.' Selling the world for the life to come is profitable. Poverty is a realm in which there is God's reward.

1. *N á m í*, how would it be, if thou didst make a place of worship, and if thou didst take refuge in the gilded castle [of Paradise].

2. Look upon the beauty of the world as upon a looking-glass: take it up, and thou, too, hast taken a glance at it.

The composer and writer of this inscription is *M u h a m m a d M a ' q ú m*, whose *nom-de-plume* is *Námí*, the son of Sayyid *Çafáí* of Tirmiz and subsequently of *Bhakkar*, who traces his descent from Sayyid *Sher Qalandar*, son of *B á b á H a s a n A b d á l*, who was born at *Sabzwár* and lived at *Qandahár*.\*

\* This inscription is also given in Sayyid Ahmad's edition of the *Tuzuk i Jahángirí*, Preface, p. 4, note; but there it is mixed up with one of the following inscriptions.



A biographical notice of Mīr Ma'cūm Nāmi will be found in my *Āin Translation*, pp. 514, 515.

## 2.

In 1008 A. H., when Akbar left for the Dak'hin and arrived at Ujjain, he ordered the following inscription to be put up on an old building there. The inscription is by the same poet as the preceding—

بتاریخ سنه ۴۴۰ الهی موافق سنه ۱۰۰۸ هجری رایات ظفرا بعزم تسخیر دکن  
باینجا عبور افتاد  
• نظم •  
نامی ز فلک دوش دلم کرده سوال • کز رفته و آینده بیان کن احوال  
گفتا چه خبر ز رفتگان نیست اثر • آینده جورفته زان چه می پر می حال

In the 44th year of the Divine Era, or 1008 A. H. [A. D. 1599-1600], the victorious army passed this place on its way to the Dak'hin.

1. 'O Nāmi, last night my heart asked fate to explain the circumstances of the past and of the future.

2. Fate answered, 'Information regarding those who have past away has no trace, and the future is like the past. What canst thou know regarding it?'

When after the conquest of the Dak'hin, Akbar returned, in 1010, to Fathpúr Sikrī, he ordered the following inscription to be put on the other side of the 'Baland Darwāzah'—

حضرت شاهنشاه فلک بارگاه ظل الله جلال الدین محمد اکبر پادشاه فتح ملک  
دکن و داندیس که سابقا مسمی به خاندیس بود نمود و در سنه ۴۶ الهی موافق  
سنه ۱۰۱۰ بفتح پور رسیده عزیمت آگره فرمود  
تا نام زمین و آسمان است • تا نقش وجود در جهان است  
نامش بسپهر همنشین باد • دانش بجهان ابد قرین باد

His Majesty whose throne is high as the heaven, the shadow of God, J a l ā l u d d ī n M u h a m m a d A k b a r S h ā h, conquered the kingdoms of the Dak'hin and of Dān-desh, formerly called Khāndesh, and arrived on the 46th year of the Divine Era, or 1010, in Fathpúr, in order to go to Āgrah.

1. As long as the names of heaven and of earth remain, and as long as Existence is found in the world,

2. May his [Akbar's] name be lofty as the heaven, and may his spirit be forever in the world.

Khāndesh was called Dāndesh in honor of Prince Dányál, Akbar's third son.

Both Mr. Beale and Sayyid Ahmad give the word *fīhá* instead of *fīhu*. Sayyid Ahmad says that Sikrī was called Fathpúr in memory of Akbar's conquest of the Dak'hin; but this is wrong.



3.

Akbar's 'Khawábáh,' or sleeping apartment, in Fathpúr Síkrí contains the following Persian verses (metre, *long ramal*)—

قصر شاهی ست بهرباب به از خلد برین \* مخفی نیست درین باب که خلدیست برین  
غرفه شاه نشیمن خوش و مطبوع و بلند \* کرده در قطعه او جنت اعلی تضمین  
فش ایوان ترا آینه سازد رضوان \* خاک درگاه ترا سرمه کند حورالعین  
چون فلک هرکه کند مسجد خاک در تو \* شود از خامیت خاک درت زهره جبین

1. The imperial palace is in every way better than the highest paradise; at least, there is no doubt that it is the highest paradise.

2. The room of the emperor is beautiful, pleasant, and lofty, and comprises in its structure the highest paradise.

3. Rizwán, the keeper of paradise, makes the carpets of thy castle (smooth like) looking-glasses; and the *Húr ul-'ín* (the 'Houris') make the dust of thy palace like *sar-mah* (which is beneficial to the eyes).

4. Whoever, like the heaven, worships the dust of thy threshold, obtains through the virtue of the dust a Venus-like forehead.

Firú'za'ba'd, east of A'grah.

Firúzábád lies about 25 miles east of A'grah. Elliot in his Glossary (Beames, II, p. 89) says it was built by Firúz Khán, a nobleman of the reign of the Sháhjahán. The nobleman alluded to is called F í r ú z K h á n or F í r ú z K h w á j a h; he was one of Jahángir's eunuchs. At Jahángir's death, he delivered Prince Shahryár into Dáwar Bakhsh's hands.\* His tomb is of white marble, and stands at the side of the road from Firúzábád to A'grah; but the inscription on it only contains verses from the Qorán.

Near Firúzábád is a tomb and a small mosque adjoining it. The tomb covers the remains of 'Iwaz Beg Khán Bahádur Hizabr-jang, who died on Sunday, 13th Rabi' I, 1189 [14th May, 1775]. The following inscription is on it (metre, *Khafí*)—

ای دریغا که فصل دی آمد \* حیف مدحیف رفت فروردین  
رو بخشگی نهاد سبز تر \* ریخت برخاک رونق نسیرین  
مرد آقا بزرگ پاک نژاد \* رفت روحش بعرش علیین  
بر سر قبر آن فرشته خصال \* فائده خوان همیشه روح امین  
تربیش را کند مگس رانی \* هر دم از زلف خویش حورالعین  
ساخت آقا رحیم روضه او \* دادش از خانه خدا تزئین  
سال تاریخ فوت آن مغفور \* فکر فایز که بود در پی این  
نگاهان هائقی کشید الف \* گفت از فوط غم بصوت حزین

\* Vide Calcutta Review for October, 1869, 'Death of Jahángir.'



لفظ مستعمل بهشت نصیب \* توبه آقا بزرگ ساز قرین  
عوض بیگ خان بهادر هزارجنگ روز یکشنبه سیزدهم ماه ربیع الاول سنه ۱۱۸۹  
وفات یافت \*

1. Alas, the chilly season has come! A hundred woes to spring departed!
  2. The fresh green has turned sere and yellow, and the pride of the rose lies scattered on the ground.
  3. The great Aghá is dead, whose descent was noble, and his spirit has fled to the heavens on high.
  4. O Gabriel, read forever a *Fátihah* at the headstone of this angelic man.
  5. The Houris of paradise waft with their curls fresh breezes to his tomb.
  6. The merciful Lord himself built his mausoleum, and made it more splendid than the temple of God [in Makkah].
  7. The date of the death of this pardoned man was expressed by the thoughtful poet Fáiz (who tried to find one,
  8. While a voice from heaven heaved a sigh, in excessive sorrow and with plaintive voice), by the word
  9. 'Bihisht-naqīb' [one to whose lot Paradise has fallen], to which you are to add 'Aghá Buzurg,' 'the great Aghá.'
- 'Iwaz Beg Khán Bahádur Hizabr-jang died on Sunday, 13th Rabi' I, 1189. A. H.

To Parganah *Firúzábád* belongs the village of *Çúfipúr*, so called after a Muhammadan Saint of the name of Sháh *Çúfi*,\* whose shrine is there. He seems to have lived at the time of 'Aláuddín. Mr. Beale has sent a copy of the following letter from Mr. Mansel, Collector of *Agrah*, to the Commissioner of Revenue at *Agrah*, dated 29th May, 1839, regarding the shrine of Sháh *Çúfi*.

"It is related by the Khádims of the dargáh, that in the reign of the emperor Akbar, Shah Sufi, a fakeer of some celebrity, wandered from *Isfahan* to India, and took up his hermitage among the *Jamuna* ravines near the city of *Chandwár*, then the country town of the Parganah of the same name, and which from the remains which still cover the surrounding country for miles—ruined mosques, dilapidated octagon mausolea, fallen entrance-gates and such like works of costly strength,—must have been an important post in a fiscal and military point of view. At the time from which the fables of Shah Sufi's miracles commence, Raja Chandersen was the lord of the fort of *Chandwár*, and a troublesome tributary of the Delhi court. Non-compliance with the royal demands for payment of revenue brought upon the Raja the investment of his fort by the army of Akbar, who is said to have commanded his forces in person and to have prosecuted his attack with no approach to success for a period which the credulous or imposing Khádims of the establishment have exalted to a term of ten years. In the language



of oriental metaphor, the emperor is said to have planted a mangoe tree on the commencement of the siege, and to have eaten the fruit of it ere his success was secured. This success was owed to the anchorite of the ravine, Shah Sufi. During a severe land storm, the lamps of the entire camp were put out, and the lights of the Shah's hut alone glimmered in the surrounding darkness.\* This extraordinary fact led to the Shah's being visited by some of the courtiers. The miraculous character of the event being much commented on by the visitors, the Shah acknowledged himself to be under the special favour of Heaven, and in the end, the conversation turned upon the difficulties of the siege, and the grateful sense of the hermit's interference which the sovereign would entertain in the event of its being brought to a close by his holy means. The Shah promised the required aid, and declared that the fort should be captured by a fixed day. Thus much for the emperor. In respect to the Raja, the Shah acted very effectually upon his superstitious fears, told him that the fort was destined to fall, and proffered his own miraculous powers to secure for the Raja a safe and honorable retreat for himself, his family, and valuables. The whole were accordingly passed invisible through the besieging camp, and the Raja quitted Hindustan for the eastward. In return for this valuable service, the emperor bestowed half of an hamlet of Chandwár on the Shah. The place assumed the name of Sufipur, and has since been inhabited by the descendants of the Shah. The decease of Shah Sufi took place soon after the grant was made, and he was buried on the brow of a deep ravine, a handsome tomb being erected over his remains. The mausoleum is still in good order and forms a picturesque object in the midst of the desolation of the Jamuna ravines in the vicinity of Chandwár and Firozabad. Its pretty dome and minarets, commanding, as they do, the heights of the Jamuna ravines, often lead the voyagers on the river to visit the shrine of the saint, and landwards the building is an object of interest and beauty, which all would regret to see lost to the country. There are several dālāns, a handsome gate, and a small mosque comprised within the building, and the whole is kept in occasional good repairs by the outlay of part of the funds of the grant. The fable of the whole is palpable. Indeed, the Raja, who under the name of Chandersen was ousted from Chandwár, lived in the reign of Aláuddín†, and his descendants were the party who fell under the displeasure of Akbar."

\* I cannot say whether this is the Sháh 'Súfi Yahyá,' mentioned by Mr. F. S. Growse in his Memoir of Mathura District, Vol. I, p. 148.

The same miracle will be found in Ibráhim Bayyú's story, Journal, A. S. Bengal, 1873, Pt. I., p. 300.

† South of the Dargáh lies a village of the name of 'Aláuddínpur.



## Gwáliár.

The Jámí' Mosque in Gwáliár,\* which was built by Mu'tamid Khán, an officer of Aurangzib's court, in 1074 A. H., or 1663-64, bears two inscriptions, one inside and one over the gateway.

Mu'tamid Khán's original name was Khwájah Núr. He was a eunuch, and received soon after Aurangzib's accession the title of Mu'tamid Khán ('the trustworthy'). In the second year, he was made a commander of 1000, and 300 horse, and Commandant of Ágrah, and was put in charge of the Imperial harem.

On the 24th Jumáda I, 1071, he was made Commandant of Gwáliár where Sulaimán Shikoh, Prince Muhammad Sultán, Prince Murád Bakhsh and his son I'zid Bakhsh, were confined. In Gwáliár he remained till 13th Rajab, 1078, when Khwájah Phúl was appointed Commandant of the fort. In 1081 and 1085, we find Mu'tamid Khán again commanding Fort Ágrah. In 1091, Mu'tamid Khán's property, consisting of 12½ lák'hs of rupees, besides jewels and cattle, was sent from Gwáliár to Court, but the *Maásir-i-'Álamgírí* says nothing regarding the cause of this confiscation. In 1099, Mu'tamid Khán was appointed Dároghah i Dágh o Taçhihah, or head of the musters and the recruiting department. He died in 1101 A. H., or A. D. 1689-90.

The Gwáliár Jámí' Mosque was therefore built by him when commanding the fort.

در زمان شاه عالمگیر آنکه • برده فیض از لطف عامش بر فریق  
آن شهنشاه که پیش جود او • بحر در آب خجالت شد غریق  
معتمد خان مصدر نور یقین • شد ز فضل حق چو توفیقش رفیق  
کرد برپا مسجد عالی اساس • زوطلب کن وصفش از فکر دقیق  
سال تاریخ بدایش خواستیم • پیر دانش گفت کال بیت العقیق

۱۰۷۴

1. In the time of Sháh 'Álamgír, who has.....
2. A king, before whose generosity the ocean feels ashamed,†
3. Mu'tamid Khán, in whom the true light‡ of faith appears, found through God's kindness grace.

\* Whether this Jámí' Mosque is the same as the Jámí' Mosque of Gwáliár mentioned by General Cunningham (Arch. Report, Vol. II, p. 370), I cannot say. But if they are the same, Sir W. Sleeman's historical particulars quoted by General Cunningham are not correct. General Cunningham gives several interesting particulars regarding Mu'tamid Khán; *vide loc. cit.*, pp. 333, 371.

† In spite of the numerous pearls which the ocean possesses.

‡ In allusion to his name Khwájah Núr (i. e. light).



4. To build a lofty mosque. Ask him minutely regarding its excellence.  
 5. I searched for the date of its construction, and the old sage told me the words  
 "Like a house of agate." A. H. 1074.

\* در اوان شاه عالمگیر عادل دین پناه \*  
 \* کز فروغ عدل او عالم پذیرفته ضیا \*  
 \* معتمد خان یافت چون توفیق حق با خود رفیق \*  
 \* ساخت این مسجد مقدس را ز صدق دل بنا \*  
 \* حاصل این چاه و این حمام هم این حجره ها \*  
 \* وقف شد بر خدمت مسجد پی نان و نوا \*  
 \* خواهم از شاهان و از حاکم عادل روزگار \*  
 \* تا نیا لایند دست از حاکمیش بهیر خدا \*  
 \* باد دایم یا رب این مسجد بفضل اهل دهر \*  
 \* تا بود گیتی و مهر و ماه و هم ارض و سما \*

1. In the reign of Sháh 'Alamgír, the just, the religious, the light of whose justice illuminates the world,  
 2. Mu'tamid Khán found grace to build with sincerity of heart this holy mosque.  
 3. The revenue of this well and this bath and these rooms was given as a perpetual grant to the servants of the mosque for their maintenance.  
 4. I request the just kings and rulers of the age not to misappropriate the revenues of the mosque for the sake of God.  
 5. O God, may this mosque through the kindness of the people of the world remain standing as long as the world, the sun, the moon, the earth, and the heaven remain !

Mr. J. Wood-Mason exhibited drawings of various Blind Crustaceans and drew attention to the fact that a species differing in no particular of generic value from *Deidamia leptodactyla et crucifer* of Willemoës v. Suhm, discovered by H. M. S. 'Challenger,' had, years before, been described by Prof. C. Heller under the name of *Polycheles typhlops*; in which species from the Mediterranean the organs of vision were also morphologically entirely wanting, being merely represented by two minute pigment-specks situated at the usual place of origin of the eye-stalks. Mr. Mason also stated that *Polycheles typhlops* and its allies could be placed in no existing family of crustaceans, recent or fossil, with the exception perhaps of the *Eryonida*, the structural characters of which appeared to be far too imperfectly known to warrant their being included in it; he, therefore, proposed to establish a new family, to be called the *Polychelida*, for their reception, and provisionally to consider them as members of its single genus *Polycheles*. Mr. Mason



further stated that the *Astacus Zaleucus* of Willemoës v. Suhm was no Astacid at all, but represented a new and very remarkable genus of *Thalassinida*, which he proposed to designate *Thaumastocheles*: in this species, particularly, the caudal 'swimmeret' had not the terminal plate of its outer branch transversely jointed as in all true *Astacida*; he was glad to find that M. Alph. Milne-Edwards, the eminent carcinologist of France, had expressed a similar opinion with regard to its systematic position, in a "Note on the *Nephropsis Stewarti* of Wood-Mas.," published in the last number of the 'Annales des Sciences Naturelles.'

Mr. Wood-Mason also exhibited specimens of *Trictenotoma Childrenii*, Gray, and read the following note thereon.

*Note on Trictenotoma Childrenii, Gray.*

So far as I have been able to discover, one additional species only of the very anomalous family of coleopterous insects, *Trictenotomidae*, of which *T. Childrenii*, Gray is the type, has been described since Professor Westwood published in his 'Cabinet of Oriental Entomology'\* the results of his dissections of the three species known to him, viz., of *T. Childrenii*, Gray, *T. Templetonii*, Westw., and *T. aenea*, Parry. Of the first-named I have recently received two specimens (♀) collected at Sámagúting, in the Nágá Hills, by Captain J. Butler, a third (♀) captured by Major H. H. Godwin-Austen in the Dhansiri Valley, and a fourth (♂) taken by one of the collectors of the Indian Museum at Johore, in the Malay Peninsula.

This species having been incorrectly described by Dupont,† whose specimen had most likely become stained by the exudation of fatty matters from the body of the insect itself, after death, or by prolonged immersion in alcohol in company with other objects, as "couverte en dessous d'un villosité jaune verdâtre," it may be worth while to correct the mistake.

The whole of the ventral surface of the insect, in both sexes, from the extremity of the abdomen to the very tips of the triangular processes that lie in front of the eyes and bound the labium (*mentum* of Westwood), the femora to their distal ends, and the narrow inflected portions of the elytra are clothed with a most delicately pure ashy-grey pubescence, wanting only on the mesosternal process, which appears to be normally shining-black, and on the middle of the posterior margins of the abdominal segments, from which it has been removed by friction; the pubescence on the labium and the fringe of hairs on the fore margin of the prosternum alone being stained with very pale luteous; the anterior and posterior faces of the tibiae, especially of the two anterior pairs, are also slightly pubescent.

The distribution of the four described species is as follows:—

*T. Childrenii*. Hab. Assam; Tennaserim coast; Johore; Java.

\* Op. Cit., p. 47, Pl. XXIII.

† Mag. de Zool., pl. 35, 1832.



*T. Templetonii.* Hab. Ceylon.

*T. ænea.* Hab. Himalayas.

*T. Grayii.* Hab. Canara, Malabar Coast.

The President announced that the Council propose to commemorate the services of their late Natural History Secretary, Dr. Stoliczka, by a suitable memorial, and had appointed a Committee to ascertain in what way the proposal could best be carried out. A circular on the subject would be issued in due course.

The following papers were read—

1. *Note on a Picture representing the taking of Palámau by Dáúd Khán, Aurangzib's General.*—By COL. E. T. DALTON, C. S. I.

Col. Dalton gives in this note a description of a picture representing the taking of Palámau, in Chutiá Nágpúr, by Dáúd Khán, Aurangzib's general.

The picture, which is in the possession of Dáúd Khán's descendants at Dáúdnagar, is on cloth and is about 30 feet by 12 feet. It represents the several stages of the fight which led to the capture of Fort Palámau on the 20th December, 1660, as related in Journal, for 1871, Part I, p. 127. Col. Dalton's note is accompanied by a photograph of the picture, taken by Mr. Peppé, a plan of the picture, and two photographs of Fort Palámau itself. The costume of the officers and soldiers as also the ethnic peculiarities of the hillmen and their arms are remarked on (*vide loc. cit.*, p. 132).

The paper will appear in No. III of the Journal, for this year.

2. *Note on Fort Ekdáláh near Paṇḍuah, Máldah District.*—By E. V. WESTMACOTT, Esq., C. S.

Mr. Westmacott fixes in this paper the position of Fort Ekdáláh, which was twice in vain besieged by Fírúz Sháh III, of Dihlí, when invading Bengal during the reigns of Ilyás Sháh and Sikandar Sháh.

Fort Ekdáláh lies N. N. E. of Máldah, about Lat. 25° 27', a little east of the Chirámaṭi, and is marked on the 1-inch-a-mile survey map. It is not given on Sheet 119 of the Indian Atlas; but the three large tanks near which Ekdáláh lies, are prominently marked.

Mr. Westmacott's paper will be printed in No. III of the Journal, Part I, for this year, and will be accompanied by a map.

Mr. Blochmann said, there was no doubt that Mr. Westmacott had now fixed upon the true site of Fort Ekdáláh. Besides the proofs adduced by him, there was some collateral evidence. Thus the places near Ekdáláh were Qaçbah (marked 'Kasba' on Sheet 119), or the 'collectorate,' and Dhánjar itself, after which the parganah, to which Ekdáláh belonged, was



called; and N. W. of it, on the Chirámaṭi, lay Paikpára, the place, no doubt, where the Bengal Paiks were stationed.

3. *Contributions towards a knowledge of the Burmese Flora*, Part I.—  
By S. KURZ, Esq.

This paper will be published in the forthcoming number of the Journal.

4. *Descriptions of nine species of Alycæinæ from Asám and the Nága Hills*.—By MAJOR H. H. GODWIN-AUSTEN, F. G. S., F. Z. S.

This paper will be published in the Journal Part II.

5. *Note on the Composition of the Calcutta Coal-Gas*.—By ALEXANDER PEDLER, F. C. S., Fellow. Chem. Soc., Berlin.

The bad quality of the gas supplied to Calcutta is the subject of very frequent remark, and judging from the amount of light furnished by most of the public gas lamps, it would be by no means an unfounded one. There is however, no doubt that the burners supplied to these lamps are so badly constructed, that they are not capable of giving anything like the maximum amount of light which should be produced by the gas. The returns of the official Gas Examiner for the past year, shew that the average illuminating power of the gas, when burnt at the rate of 5 cubic-feet per hour from a standard argand burner, equalled the light of 13 sperm candles burning 120 grains per hour; and he has also shewn that the generality of the street gas-lamps do not give a light equal to more than seven or eight candles. It would be obviously unfair then to condemn the gas because of the badness of the light of the street lamps.

A coal-gas which only gives a light equal to thirteen candles is, however, of very poor quality, for very few large towns are satisfied with a gas giving less than sixteen candles, the minimum now allowed in London. There is no doubt that the large quantity of ammonia which is present in the gas of Calcutta, and which has averaged during the past year 37·5 grains per 100 cubic feet, must deteriorate its illuminating power to some extent, and there is also no doubt that this is the cause of the excessive fouling of the gas-pipes, fittings &c., which is a frequent source of annoyance, and which may also produce a further decrease in the illuminating power of the gas.

Judging, however, from the composition of the various samples of Indian coals, such as are obtained from Sanktoria, Dumarkanda, Rániganj, Banali and Mangalpur, the analyses of which have been published by the Geological Survey, there did not appear to be any reason, why illuminating gas of a very fair quality should not be obtained from them, if properly treated. It appeared to me to be very probable that the low illuminating



power of the gas was due either to the presence of a considerable amount of impurity, or to an imperfect manufacture of the gas. So far as I am aware, the composition of the gas supplied to Calcutta has never been ascertained, and it appeared to me that it would be interesting to determine its exact chemical composition, so as to judge of the cause of its bad quality. For this purpose, I have made a series of analyses, the results of which are appended in the table on the opposite page. In the first four columns of the table will be found four analyses of the gas supplied on various days to Calcutta, and in the fifth column, is given the average composition of the Calcutta gas as deduced from twelve analyses. For the purposes of comparison, I have introduced into the table the analyses of two samples of London gas, and one sample of Manchester gas, the latter being of good quality, the two former only fair in quality.

The illuminating power of any sample of coal-gas depends upon the amount of the illuminating hydrocarbons (belonging to the  $C_n H_{2n}$  series) which it contains, and, to a great extent, on the proportion of carbon contained by these hydrocarbons, as shewn by the amount of carbonic acid generated by them. A glance at the table will shew that in luminiferous constituents the Calcutta coal-gas is tolerably rich, and yet we have already seen that the illuminating power is in fact less than that of London gas, which contains a much smaller proportion of hydrocarbons; it therefore at once becomes evident that the loss of light must be due to the presence of some impurities.

The chemical composition of the gas shews that there are both imperfections in its manufacture and in its purification. In the first place, we have no less than 4.79 per cent. of carbonic acid present in the gas; this, as is well known, is an impurity most destructive to the illuminating power; it has been shewn that for every 2 per cent. of this substance present the illuminating power of coal-gas is diminished to the extent of from one candle to one and a half candles; that is to say, if this impurity were removed (which is a very simple matter) the illuminating power of the gas would be increased from thirteen candles to about fifteen or sixteen candles. The second point that I have to draw attention to, is the *extremely* large amount of nitrogen present; this can only arise from imperfections in the manufacture; it means to say, that about 15 per cent. of the gas supplied as coal-gas, has been drawn in from the air during the process of manufacture, and it shews that either the retorts are in a very dilapidated condition, or that sufficient care is not taken to keep the retorts properly closed, when the gas is being formed. The presence of the nitrogen in the gas is decidedly detrimental to its illuminating power, but even supposing that it has simply a diluting effect, and no injurious action on the gas, the absence of the nitrogen would raise the illuminating power from 13 to 15.3 candles. It has, however, been shewn by the experiments of



	Calcutta Gas					Average position of 12 samples Calcutta Gas.	London Gas.		Manchester Corporation	Calcutta Gas.	
	April 28 8-15 P. M.	July 10th 8-55 P. M.	July 16th 12 P. M.	July 20th 11-40 P. M.	Great Central Co.		Chartered Co.	July 24th, 1874. 7-30 P. M. 8-15 P. M. 11-45 P. M.			
Illuminating Hydrocarbons (of $C_n H_{2n}$ series), ...	5.78	6.47	5.99	6.24	6.32	3.56	3.53	10.81	6.16	6.30	6.51
Marsh Gas, ...	36.46	44.99	37.56	44.66	40.35	35.28	35.26	41.99	40.71	41.88	43.41
Hydrogen, ...	32.16	24.31	29.32	20.17	25.64	51.24	51.80	35.94	24.73	26.55	25.05
Carbonic Oxide, ...	3.34	3.70	8.49	5.32	7.53	7.40	8.95	10.07	6.53	5.37	5.33
Carbonic Acid, ...	4.53	4.94	4.48	4.90	4.79	0.28	0.00	1.19	4.91	4.61	4.40
Oxygen, ...	0.99	0.69	0.88	0.37	0.60	0.44	0.08	traces	0.35	0.43	0.50
Nitrogen, ...	11.74	14.90	13.28	18.34	14.66	1.80	0.38	traces	16.61	14.86	14.80
	100.00	100.00	100.00	100.00	99.89	100.00	100.00	100.00	100.00	100.00	100.00
Amount of Carbonic Acid generated by 1 volume of the illuminating Hydrocarbons, ...	...	...	...	...	2.3	4.0	4.0 about	2.8			
Illuminating power of gas when burned at the rate of 5 cubic feet per hour, equal to standard sperm candles, ...	...	...	...	...	13	16 (about)	16 (about)	22.1			





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Correspondence respecting Relations with Persia. (P. P. 1857.)

Statements exhibiting the Moral and Material Progress and Condition of India during the years 1859-60, 1860-61, five parts.

Papers relating to the Nizam. (P. P. 1859.)

„ „ Amir Ali Moorad's Claim. (Coffey's Petition). (P. P. 1858.)

Correspondence referring to the Duties of the Dewanny of the Provinces of Bengal, Behar and Orissa. (P. P. 1870.)

Memorial to the Secretary of State with reference to the admission of the Natives of India to the Medical Department of the Army, and Reply thereto. (P. P. 1861.)

Correspondence on the subject of the Settlements in the Straits of Malacca. (P. P. 1858.)



Correspondence relative to the Annexation of the Berar Territory. (P. P. 1856.)

Report on the Administration of Oude and the Governor-General's Minute thereon, dated 22nd April, 1859. (P. P. 1859.)

Papers relating to the Property of the late Nawab of Surat. (P. P. 1857.)

„ Amir Ali Moorad's Case. (P. P. 1858 and 1860.)

Convention between Her Majesty and the Emperor of the French relative to the Emigration of Labourers from India to the Colony of Reunion. (P. P. 1160.)

Despatch respecting Coolie Immigration into the Island of Réunion from British India. (P. P. 1863.)

Copy of the Covenants entered into by Members of the East India Civil Service. (P. P. 1861.)

Opinions recorded by the Council of India on the Directions for the Preparation of a Bill to Confirm certain Appointments in India, and to amend the Law concerning the Civil Service of India. (P. P. 1861.)

Convention between Her Majesty and the Sultan for the Establishment of Telegraphic Communication between India and the Ottoman Territory. (P. P. 1865.)

Papers relative to Telegraphic Communication in the Mediterranean, and with India. (P. P. 1860.)

„ „ the intended Transfer of the Falmouth and Gibraltar Cable to a Line from Rangoon to Singapore. (P. P. 1860.)

Minutes of Evidence taken before the Select Committee on the Red Sea and India Telegraph Bill. (P. P. 1861.)

Reports from India and Laws or Decrees passed respecting the Establishment of Telegraphs in India. (P. P. 1855.)

An Act for enabling the Commissioners of H. M's. Treasury to make Arrangements with the Red Sea and Indian Telegraph Company. (P. P. 1862.)

Correspondence on the subject of the Transfer of the Lines and Property of the Red Sea Company to the Telegraph to India Company. (P. P. 1862.)

Report on the Expenditure on the Persian Gulf Submarine Telegraph and Land-line to Kurrachee. (P. P. 1870.)

Papers relating to the Godavery. (P. P. 1862.)

Report of the East India Indigo Commission. (P. P. 1861.)

Government of India Despatch to the Secretary of State on the Indigo Commission Report, with Copy of the Report and Memorials from the Planters. (P. P. 1861.)



Memorial of the Indian Landowners' Association on Indigo Contracts, and the Answer thereto. (P. P. 1861.)

Finance and Revenue Accounts of the Government of India, for the year 1859-60. (P. P. 1861.)

Correspondence on the probable Financial results of the Abolition of Pilgrim Taxes, and other sources of Revenue from Religious Establishments, 1836.

Memoranda on the N. W. Frontier of British India, drawn up by desire of Sir J. Malcolm, 1830.

Extract from a Report on the District of Babriawar, in Kattywar, 1843.

Selected Reports on the Revision of Settlement in the Delhi Territory, Parts 1 and 2.

A Report exhibiting a view of the Fiscal and Judicial system of Administration, introduced into the Conquered Territory above the Ghauts, by W. Chaplin, 1838.

Selections from the Records of the Madras Government.—No. III. Report on the Proposed Abolition of the Madras Mint. No. IV. Report on the Paumban Channel. No. V. Collective Memorandum on Public Works in the Madras Presidency.

Selections from the Records of the Bengal Government.—No. 5. Papers on the Sikkim Morung, and on Kooch Behar.

Report of the Conservator of Forests, Madras, 1863-64.

Report on the Main Drainage of Bombay, by R. Aitkin, dated 21st December, 1866.

Report on the Experimental Revenue Settlement of certain Villages forming Kownace Talooka of the Nassick sub-collectorate, 1853.

Report on the Badamee and Bagulkote Talookas, Belgaum, 1853.

Memoir on the Zillah of Baroche, 1855.

Report of the Committee on Prison Discipline, Calcutta, 1838.

Annual Report on the Management and Conservancy of the portion of the Oudh Forest lying between the Sardah and Koorially Rivers, 1861-62.

Report upon the Agra Jail Epidemic Cholera of 1861.

” ” General Condition of the Province of Kattewar in 1842.

” ” Settlement of Zillah Humeerpore, 1842.

” ” ” Zillah Etawah 1844.

Selections from the Records of the Bombay Government in the Police Branch of the Judicial Department, Nos. I and II, 1853.

Report of the Committee of Enquiry on the Colaba Observatory, 1865.

Selected Minutes by the Hon. M. Elphinstone, in the Military Department, 1820 and 1827. Bombay, 1867.



Reports of the Civil Judicial Administration of the Bombay Presidency in 1848, 1851-54, 1862.

Survey and Assessment Report of the Poona Collectorate, 1828.

Survey Reports on the Purantey, Hursol, Morassa, Bayur, Verangam, and Duskroee Pergunnas, in the Ahmedabad Collectorate, 1827.

Report on the Mhairwarra District, 1841.

Compilation of Papers selected from the Records of the Government of Bombay, Revenue Department, relating to Artificial Irrigation, 1838.

Correspondence of the Inam Commission on the Deccan Surinjams, 1856.

Circular Orders of the Revenue Department, Bombay. Two Volumes.

Selection of Papers from the Records of the East-India House, Vol. III. 1826.

Indices to Vols. I, II, III, of the Selection of Papers from the Records of the East India House.

Bombay Mint Assay Report of Mahmooddee and Soojaee Rupees, from the Punjáb.

„ of four different descriptions of Gold Coins.

„ of Java Guilder pieces.

„ of Punjaub Coins and new and old Furruckabad Rupees.

„ of "Nasirooddeen Shah Kerans," from the Persian Gulf,

1862.

„ of 200 Rupees of different descriptions, from Baroda.

Rates at which Company's or Bombay Rupees are Legal Tender, 1836.

Notes regarding Meenas, and other Criminal Classes in the Goorgaon District. Lahore, 1865.

Reports of Road and Tank Department (Bombay) for 1844-45, 1845-46.

Report on the Judicial Administration, Madras, 1863 and 64.

Bombay Public Works Budget, for 1862-63.

Compilation of Circular Orders relative to Police matters passed by the Faujdaree Adaulut of Bombay from 1824, to 1852.

Circular orders of the Government of Bombay on Police subjects, Vol. I, 18th October, 1852 to 29th June, 1853, and Vol. II, from July, 1853 to 30th Sept. 1855.

Report on the Ganges Canal, Vol. III, Plans.

Dorjiling, by H. V. Bayley, 1838.

History, Antiquities, Topography and Statistics of Eastern India, by Montgomery Martin, Vols. I to III, (Vol. I; 3 copies, Vol. II; 1 copy and Vol. III; 3 copies).

Report on the Pulni Mountains, to accompany the Series of Sketches by Lt.-Col. Hamilton, 1864.



Report on Passages made on the Nerbudda River from Dharee to Mundlaisir, and from Mundlaisir to Broach, by Lieuts. Keatinge and Evans.

A brief Historical Sketch of the Bheel Tribes inhabiting the Province of Khandesh, by Capt. D. C. Graham, 1843.

Translation of M. Gilbert's Notes on Abyssinia.

Reports on the Districts of Midnapore and Cuttack, by H. Ricketts, C. S.

Report on the State and Navigation of the Indus, below Hydrabad, in 1836.

On the Course of the River Nerbudda, by Lieut. Col. Ouseley, 1845.

Supplement to the Itinerary for Western India, by Captain J. Clunes.

Memoir accompanying a Chart of the Upper Indus by Lieut. Grounds, I. N., 1852.

Description of the North-East Coast of Australia by Captain King.

Australian Navigation—Journal of H. M. Ship Crocodile, from Sydney through Torres Straits.

Map of the Hyderabad Collectorate.

Survey Map of the Island of Oorum.

Chart of the Gulf of Cutch.

Map of the Island of Bombay.

Map of Abyssinia, 5 sheets.

Map of Maritime Arabia.

Map of the Poona Collectorate.

„ Dushpore Pergunna, Ahmedabad Collectorate.

„ Tanna Collectorate.

„ Guzerat.

„ Scinde, 4 sheets.

„ Cutch and the Runn.

„ Rajputana.

„ Sattara Territory.

Cotton Map of the Madras Presidency.

THE GOVERNMENT OF BOMBAY.

*Purchase.*

Pratna Kamra Nandini, Vol. VII, No. II.

Dictionary of the Páli Language, by Robert C. Childers. Part. I.

Conchologia Indica, Part 6.

The Calcutta Review, July, 1874.

*Exchange.*

Nature, Nos. 240-244.



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR NOVEMBER, 1874.

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The monthly General Meeting of the Society was held on Wednesday, the 4th instant, at 9 o'clock P. M.

Col. H. Hyde, President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table—

1. From the Secretary to the Government of India, Foreign Department—a set of Photographs of the paintings in the Ajunta Cave Temples.
2. From Bábu Udaychand Dutt, Civil Medical Officer, Noák'hálí, a skull and some bones of a huge sea fish cast ashore on the Island of Sondíp.

Mr. Wood-Mason stated that the bones lying on the table were in all probability those of a small individual of the whale, *Balenoptera indica*, of which a gigantic specimen was represented in the Society's collection by the two rami of a mandible and some other bones. The Indian Museum also possessed an almost perfect skeleton of the same species which had been obligingly secured for the collection by the Hon'ble Ashley Eden, having been stranded in the estuary of the Sittang River. The bones now sent included the skull less the bones of the face, the basihyal with the ankylosed thyrohyals, a perfect scapula, a radius and an ulna of opposite sides, some vertebræ without epiphyses and some epiphyses without vertebræ, some fragments of ribs, &c. Every fragment of the skeleton of these great marine Mammals was of value, and these bones, their fragmentary condition notwithstanding, would form a valuable addition to the Museum, but it was much to be deplored that the donor did not sooner make up his mind to forward them, while they were more perfect and more numerous.

3. From Sharif Salim Ahmad Sahib, Bombay—a copy of the Vichar Ságar, a Sanskrit work on Vedantic philosophy.

4. From L. Schwendler, Esq.—a copy of his 'Instructions for the electrical testing of lines and offices, No. III.'



The following gentlemen duly proposed and seconded at the last meeting were elected Ordinary Members—

A. Constable, Esq.

R. Knight, Esq., Calcutta.

Bábu Bhugobutty Churn Mallik.

The following gentlemen are candidates for ballot at the next meeting—

Maulawí Khudá Bakhsh Khán Sáhib, Pleader, Bankipore, Patna, proposed by Mr. H. Blochmann, seconded by Col. H. Hyde.

Bábu Rám Dás Sen, Zamíndár, Berhampore, proposed by Col. H. Hyde, seconded by Mr. H. Blochmann.

Captain Protheroe, Dy. Commissioner, Port Blair and Nicobar Islands, proposed by Mr. J. Wood-Mason, seconded by Dr. T. R. Lewis.

R. E. Egerton, Esq., Financial Commissioner, Panjáb, proposed by Major-General R. Maclagan, seconded by the Hon'ble E. C. Bayley.

The following gentlemen have intimated their desire to withdraw from the Society—

Captain E. Swetenham ; F. R. Mallet, Esq.

The President then announced to the meeting that a Geographical Congress would be held in Paris in spring 1875.

He said that he had received a letter from the French Consul General, Calcutta, forwarding a prospectus by the promoters of the Congress together with a collection of 123 geographical questions upon which information was specially solicited. He had ordered a copy of these questions to be kept in the office, should any member wish to see them, and he would now read out the letters. As the Committee of the Congress desired to have the addresses of gentlemen likely to take an interest in the scheme, the Council had proposed the following names—Col. H. Hyde, R. E., President, Asiatic Society ; Col. H. L. Thuillier, C. S. I., Surveyor General of India ; Col. J. T. Walker, R. E., Superintendent of the Great Trigonometrical Survey ; Col. J. E. Gastrell, Superintendent Revenue Survey ; W. T. Blanford, Esq., Geological Survey ; Captain J. Butler, Political Agent, Nágá Hills ; Col. E. T. Dalton, C. S. I., Commissioner of Chota Nagpore ; J. W. Edgar, Esq., Dy. Commissioner of Darjeeling ; Sir T. D. Forsyth, K. C. S. I., C. B. ; W. Heeley, Esq., C. S. ; Captain W. G. Hughes, Dy. Commissioner, Hill Tracts, Arakan ; Dr. W. W. Hunter, Director-General of Statistics ; Dr. J. King, Superintendent, Botanical Gardens, Calcutta ; S. Kurz, Esq., Curator, Herbarium, Calcutta ; Lieut.-Col. W. E. Marshall, Simla ; S. E. Peal, Esq., Seeksagar, Assam ; The Hon'ble Justice J. B. Phear, Calcutta ; Bábu Rájendralála Mitra, Calcutta ; Dr. D. Brandis, Inspector General



of Forests, Calcutta ; Dr. W. Schlich, Conservator of Forests ; Commander A. D. Taylor ; W. Theobald, Esq., Geological Survey ; Capt. W. J. Williams, Garo Hills ; Capt. J. Biddulph, A. D. C. to the Viceroy ; Capt. W. T. Trotter, R. E., Great Trigonometrical Survey ; J. B. Hennessey, Esq., do. ; Capt. W. J. Heaviside, R. E., do. ; Ney Elias, Esq., British Burma ; Dr. J. Anderson, Calcutta ; Major-General A. Cunningham, C. S. I., Simla ; Major T. Lewin ; Dr. H. Cayley ; Capt. H. C. Marsh ; R. T. St. John, Esq., British Burma ; Major T. G. Montgomerie ; W. Johnson, Esq., Ladakh.

The following were the letters—

1. From the French Consul General, Calcutta, 5th August, 1874.

"I have the honor to forward you a copy of a letter, with enclosures, I have received from the French Geographical Society, through the Ministry for the Foreign Affairs, relating to the International Congress of the geographical sciences to be held in Paris during the spring of the next year.

"From the letter of the President of the Society, you will see that the Committee of the Congress would be most happy to be assisted in this undertaking by the foreign learned Societies as well as by men of science and travellers of all countries. I take, therefore, the liberty to ask you whether I might name the Asiatic Society of Bengal for the International Honorary Committee.

"I shall feel obliged by your suggesting at the same time the names of the travellers to whom I might appeal in this country on behalf of the Congress.

(Signed) E. AUDISIO,

*Acting Consul General for France."*

2. From the General Secretary, 10, Boulevard Latour-Maubourg, Paris.

#### INTERNATIONAL GEOGRAPHICAL CONGRESS.

(Translation.)

"The knowledge of our terrestrial dwelling is a science," said one of our most distinguished geographers, "with which we are connected by the most intimate ties: few subjects touch upon so numerous and large interests."

"And yet like all other sciences, Geography was for a long time the exclusive province of a few scholars. It had no share in the movement which carried mankind towards study, till the taste for scientific researches spread over the world. Governments countenanced its progress, then free associations were successively formed in different places, in order to give to the geographical pursuits a quicker impulse. These Societies had scarcely been created when they experienced the need of having their separate works collected, at first by a regular correspondence being established,



and afterwards, thanks to the easier ways of communication, by inviting to discussions all men who devoted themselves to such important problems.


‘This was the object which brought about the Congress held in 1871 at Anvers; and if the great and legitimate success of this scientific festival was principally due to the enlightened zeal of eminent leaders and to the eagerness of many adherents, we must also trace it to the exceptional interest of the science itself, the field of which is cultivated by many and thus proves a common arena for varied researches.

‘This is the way, which the Geographical Society of Paris intends to follow in its turn, encouraged by the very first men who had pointed it out. Strengthened by the support of the President of the Republic and expecting to obtain the support of foreign governments, it has decided that a new Geographical Scientific Congress shall be convened in Paris during the spring of the year 1875.

‘To study the earth in its various aspects, its physical constitution, the manifestations of life on its surface; to examine the ways to measure and represent it and determine its relations to the heavenly bodies; to re-establish the successive states of our planet at its different epochs and find out on the soil the traces of the history reconstructed by modern erudition; to try to render the intercourse between nations quicker and easier, and give man, by degrees, the whole habitable surface; to compare with each other methods of teaching and to concentrate the exertions tending to the diffusion and advancement of science; to act in concert in explorations to be undertaken; to state what is certain, discuss what is doubtful, and to find out by a theoretical and practical study of the earth what is not yet known, this is the aim of the Paris Congress.

‘We therefore appeal to geographers who specially devote themselves to this branch of study; to the learned men who in other pursuits require the aid of Geography; to the travellers who, at the risk of their lives, have widened the horizon of Science and multiplied the roads of trade; to the professors who by their teaching or writings, have contributed to the spread of geographical knowledge; to the engineers who, by their admirable works, have created roads of communication all over the world; to all those at last, and there are many, who take a deep interest in these questions and think it useful to propagate more and more a thoroughly necessary science.

‘We invite to this peaceful land men of all countries, knowing that they will bring with them no other passion but the passion for truth. We shall especially ask the assistance of foreign scientific Societies and request them to send delegates, to name the gentlemen to whom letters of convocation ought to be sent, to point out the questions which might be advantageously put.





‘The Congress will be followed by an Exhibition of the objects relating to the study of Geography. Rewards will be distributed to the most deserving amongst the exhibitors.

‘This is the whole of the program of the measures which the Geographical Society will take in order to give the movement all the splendour it deserves. The Society, relying on the usefulness of its undertaking and supported by high patronage and by many friends, will devote itself with solicitude and perseverance to a work of enlightenment and peace.

(Signed) *BARON DE LA RONCIERE-LE-NOURY, Vice-Admiral,  
President, Geographical Society, Paris.*

*DELESSE, INGENIEUR EN CHEF DES MINES,  
President, Central Commission.*

*MAUNOIS,  
General Secretary, Geographical Society.*

*BARON R. REILLE,  
Commissaire Général du Congrès.  
Paris, 28th March, 1874.’*

The President then said—At the General Meeting of the Society in April last, the Council recommended for the consideration of Members certain alterations in Rules 14, 34d, and 36, of the Bye-Laws of the Society. The usual voting papers had been sent to all Non-Resident Members, of whom fifty-one had forwarded their votes to the Secretary. It was the business of this evening to take the votes of the Members present. He would order the Secretary to distribute the voting papers, and read out in the meantime the rules as they had hitherto stood and the amended rules as proposed by the Council.

# I.

## *Present Rule.*

**Sec. 14A.** In the event of an Ordinary Member leaving India, and in the further event of his informing the Secretary by letter that he has no intention of returning, but desires to retain his privileges as an Ordinary Member, his subscription shall be 12 rupees *per annum*, commutable into a single payment of Rs. 100: provided that if any such Member shall thereafter return to India, he shall thereupon become liable to pay his original subscription, subject to

## *Proposed Rule.*

**Sec. 14A.** In the event of an Ordinary Member leaving India, and in the further event of his informing the Secretary by letter that he has no intention of returning, but desires to retain his privileges as an Ordinary Member, his subscription shall be 16 rupees *per annum*, commutable into a single payment of Rs. 160: provided that if any such Member shall thereafter return to India, he shall thereupon become liable to pay his original subscription, subject to



the operation of Rule 10 B.

the operation of Rule 10 B., and provided that Members who are at present paying Rs. 12 *per annum*, or who shall have paid Rs. 100 as composition, shall not be called on to pay the higher rates.

## II.

### *Present Rule.*

Sec. 34 (d). The President, or, in his absence, one of the Vice-Presidents, shall take the Chair. If neither the President, nor one of the Vice-Presidents, be present within fifteen minutes after the hour appointed for the Meeting, the Members present shall elect a Chairman.

### *Proposed Rule.*

Sec. 34 (d). The President, or, in his absence, one of the Vice-Presidents, shall take the Chair, or in their absence the Senior Member of the Council. If neither the President, nor one of the Vice-Presidents, nor a Member of the Council, be present within fifteen minutes after the hour appointed for the Meeting, the Members present shall elect a Chairman.

## III. That the following Rule be added after Rule 36.

36A. "With reference to the provisions of Act XVII. of 1866 (The Indian Museum Act), Section 3, the Trustees of the Indian Museum on the part of the Society shall be nominated from among the members of the Council, with the proviso that on vacation of their seats in the Council they shall resign their Trusteeships."

Messrs. D. Waldie and E. Gay, at the request of the President, collected the voting papers and acted as Scrutineers.

The Scrutineers then gave the results to the President, who announced, in accordance with the Society's Bye-Laws which require a majority of three-fourths in case Rules are altered,—

*First*, that the proposed alteration of Sec. 14 A. was *not* carried.

*Secondly*, that the proposed alteration of Sec. 34 (d) and the addition to Sec. 36 were carried.

The President then said, he wished to remind the members of the facility which the Council had afforded them of visiting the Library of the Society on Friday mornings at 7 A. M. The time of opening had been altered in consequence of a request made by several members, who had no leisure to consult the Library in the course of the day. Very few members, however, in fact only four, had since June last availed themselves of the early opening. The arrangement was productive of a small outlay; but the Council had at present no wish to do away with it, at least not during the cold season, and he thought it would be well, again to draw the attention of the members to the convenience that was afforded them of consulting the Library once a week in the morning.

The President also announced on the part of the Council that during the absence of Capt. J. Waterhouse and Col. Gastrell, Mr. H. Blochmann



would act as General Secretary and as Treasurer of the Society, in addition to his duties as Philological Secretary.

*Also*, that they had appointed Bábu Gopal Chandr Dutt as First Clerk of the Secretary's Office, on Rs. 60 a month; and that Yúsuf Ali, Store-keeper, had been dismissed.

The Secretary laid before the Meeting a Copper plate, presented to the Society by Mr. A. L. Clay, C. S.

Mr. Clay states that the plate was found at the time of re-digging a pond in Nasirábád, a village on the south-east corner of the town of Chittagong. The pond formerly belonged to the Bhats of the village; but it now belongs to a Muhammadan.

The plate is a grant of land made in 1165 Saka, or 1243 A. D., by Rájá Dámudar Deb, son of Bāsú Deb, son of Madhusudan Deb, son of Purushottam, of Tripura (Tiparah).

Mr. Blochmann said that the plate was of great interest as it shewed that Chittagong (Chátgáon) belonged in the beginning of the 13th century, when the Muhammadans had just conquered Bengal, to the Mahárájás of Tiparah. The plate mentions the names of four of them. They are, however, not given by Rev. J. Long in his short Analysis of Ráj-Málá, a poem which contains the family history of the Mahárájás (Journal, Vol. XIX, for 1858.)

The plate had been made over to Bábu Prannáth Pandit, member of the Society, who had read and translated it. A facsimile of the plate and the Bábu's remarks on it would be published in the fourth number of the Journal, Part I, for 1874. The thanks of the Society were due to Mr. Clay for his interesting presentation.

The President exhibited one gold and two silver coins belonging to himself.

Mr. Blochmann said that the first coin, a small thick silver piece, not much larger than a two-anna piece, contained on one side the words

محمد شاه بن لطيف شاه سلطان

Mahmúd Sháh ibn Latíf Sháh, the king.

The reverse was too much cut away. The coin is a Gujarátí coin. Mahmúd Sháh, III., son of Latíf Khán, son of Muzaffar Sháh, reigned from A. D. 1537 to 1553; *vide* Thomas, Chronicles, pp. 351 to 353.

The second was a small square Kashmir silver coin.

OBVERSE—محمد همايرن سلطان Muhammad Humáyún Sultán.

REVERSE—ضرب کشمير Struck at Kashmir.

The year is effaced. It is curious that the letters of the reverse are inverted, but they are easily made out by holding the coin before a looking-glass.



The third coin was a posthumous gold coin, containing the name of Ahmad Sháh of Dihlí. The obverse, as usual in the coinage of the 18th century, forms a distich (metre, *long Ramal*)—

حكم شد از قادر بیچون باحمد پادشاه • سكه زن برسيم وزر از اوج ماهي تا بماه

The Almighty who has no equal gave Ahmad Sháh the order to coin silver and gold from the Fish [upon which the earth stands] to the Moon.

REVERSE—ضرب دار الخلافت جلوس عیمنت مانوس سنة ۱۱۴۰

Struck at the capital [Sháhjahánábád], in the 14th year of the auspicious accession.

The coin is not rare, but curious, inasmuch as it was struck when Ahmad Sháh was no longer reigning emperor.

Ahmad Sháh, son of Muhammad Sháh, succeeded his father on the 2nd Jumáda I, 1161, or 19th April, 1748\*; he was deposed by 'Imád ul-Mulk in the end of Jumáda II, 1167, or beginning of 1754; was blinded by him on 10th Sha'bán, 1167, or 2nd June, 1754; and died in prison on 2nd Sha'bán, 1188, or 25th May, 1774. Ahmad Sháh, therefore, only reigned six years.

The 14th year, therefore, would commence on the 2nd Jumáda II, 1174; and the 11th year, which some coins have, on the 2nd Jumáda II, 1171. But specimens in the possession of Mr. Delmerick have not only the 11th and 14th years on the reverse, but also the years 1170 and 1173 respectively on the obverse; and as the accession of Ahmad Sháh Durrání took place in 1160, Nádir Sháh having been killed in Jumáda I, 1160, the 11th and 14th years of the Durrání's reign would correspond to 1170 and 1173. It looks, therefore, as if the coinage of Ahmad Sháh of Dihlí was *revived* during Ahmad Sháh Durrání's stay in India in 1170 and 1173-74, the names of both kings and the month of their accessions being the same. The commencements of their reigns differed by exactly one year.

In 1170, Ahmad Sháh Durrání married the daughter of the late Muhammad Sháh; he was, therefore, brother-in-law to the blind Ahmad Sháh of Dihlí.

Mr. Blochmann exhibited a Persian MS., belonging to him, containing a 'Collection of Choice Poems.' The MS. is beautifully written and richly ornamented. It was the property of the Prince Khurram [Sháhjahán], who at the age of fourteen entered on the fly leaf of the MS. the following remark—

\* In Prinsep's 'Useful Tables' by Thomas, pp. 198 and 199, there are four mistakes well worth correcting :—

1026 A. H. commences on 30th Decr. 1616, not 1617.

1060 A. H. commences on 25th Decr. 1649, not 1650.

1127 A. H. commences on 27th Decr. 1714, not 1715.

1161 A. H. commences on 22nd Decr. 1747, not 1748.



پنجم آذر سنه اول سنه ۱۰۱۴ داخل کتابخانه علیحضرت ظل الهی نور الدین  
جهانگیر پادشاه بن اکبر پادشاه حرره بیده خرم بن جهانگیر •

The 5th A'zar of the first year of the reign, in A. H. 1014 [A. D. 1605]. Belonging to the library of his august majesty, the shadow of God, Núr uddín Jahángír Pádisháh, son of Akbar Pádisháh. Written with his own hand by Khurram, son of Jahángír.

The autograph, curious to say, bears the same date as Jahángír's autograph, published in Journal, A. S. Bengal, 1870, Pl. XIII, and p. 271, and Proceedings for July 1869, p. 190. It is, therefore, clear that both autographs were written by Jahángír and Prince Khurram on the same day when inspecting the Library, and thus prove each other's genuineness.

It is a pity that the MS. does not give the name of the *Katib*.

Mr. Blochmann laid before the meeting translations of the following inscriptions from A'grah, Sikandrah, and Nárnául, in continuation of the inscriptions published by him in the Proceedings of the Society for August last.

#### A'grah.

The following inscription is taken from the Dihlí Gate of the A'grah Fort. Mr. Keene says that it is found in the ground floor chamber to the right of the Dihlí Gate. The prose portion on the top is incomplete, some of the letters being broken, and refers to Akbar's march to Khándesh and his return to A'grah.\* The poetical portion below contains a *tárikh* by the poet Muhammad Ma'cúm Námi, of Bhakkar,† on Jahángír's accession in 1014, A. H., or A. D. 1605. The text of the inscription I have taken from the "Transactions of the Archæological Society of Agra," 1874, p. xx.‡

حضرت شاهنشاه جمجاء خلافت پناه ظل الله جلال الدین محمد اکبر پادشاه  
در سنه ۱۰۰۸ توجه ..... فرمود و در سنه ۱۰۱۰ نزول اجلال فرمود .....  
چون بگذارد آگره جاي گرفت •  
شاه جهان چون گرفت جاي بنخت شرف • تخت ز رفعت نهاد بر زبر چرخ پا  
دست دعا برکشاد پیدر فلک از نشاط • گفت که بادا مـ دام حکم تو فرمان روا  
خواست که نامي کند سال جلاوشش رقم • بود دران دم لبش پر ز ثنا و دعا  
میل دو چشم حسود يك الفش کرد و گفت • باد جهان پادشاه شاه جهان گیر ما  
قائله و راقمه محمد معصوم البکري اصلا

His Majesty, the Emperor, a Jám in dignity, with whom royalty takes refuge, the shadow of God, Jaláluddín Muhammad Akbar Pádisháh, set out in 1008 ..... and arrived in 1010 ..... in A'grah.

\* Like the Fathpúr Sikrí Inscription in the Proceedings for August, p. 175.

† *Xin* Translation, pp. 514, 515.

‡ Mr. Carlleyle's reading in Vol. IV. of General Cunningham's Archæological Report (p. 114) makes no sense. General Cunningham's footnote (*loc. cit.*, p. 115) is undoubtedly correct: Námi had been dead for some time when Sháhjahán succeeded to the throne.



1. When the king of the world took his seat on the throne of distinction, the throne thus exalted placed its foot on the revolving sphere.

2. And the ancient heaven from joy extended the hand of benediction, and said, 'May thy rule be royal for ever!'

3. Námí wished to write down the date of his accession, his lips being at the same time full of praise and blessing;

4. Its Alif pierced the two eyes of envy, and he said "May our king J a h á n g í r be the king of the world!" 1015—1 = 1014, A. H.

*Its Alif, i. e.,* the Alif of the *tárikh*, pierces the eyes of envy, *i. e.,* of critics; hence critics cannot see that the *tárikh* contains a superfluous alif, or 1. On adding up, therefore, we get 1015—1 = 1014.\*

#### Jahá'ngir's Black "Marble" Throne in the A'grah Fort.

This large marble slab, which is 10 ft. 7½ in. long, 9 ft. 10 in. broad, and 6 in. thick, lies at present in Sháh Jahán's palace (the *Díwán i Kháf*) in the fort of A'grah. It has often been seen and described by travellers (*vide* Mr. Keene's 'Hand-book for Visitors to Agra,' 1874, p. 19). The stone is a historical record of Jahá'ngir's rebellion against his father. While Akbar was in Khándesh, Sháh Salím (as Jahá'ngir was called as prince) proclaimed himself emperor at Iláhábád, and it was there in 1011, that he gave orders to have the stone cut. From Iláhábád it was subsequently, at Jahá'ngir's request, brought to A'grah, as will be seen from the following passage from the *Tuzuk i Jahá'ngirí* (p. 85, Sayyid Ahmad's edition):—

"Daulat Khán [a eunuch, who afterwards was Faujdár of Iláhábád and Sirkár Jaunpúr], whom I had some time ago sent to Iláhábád to fetch the black stone throne, arrived on Wednesday, 4th Mihr, 1019 [August, 1610] with the stone all safe and uninjured. It is, indeed, a fine slab of stone, very black, and very shining. Many believe that it a kind of touchstone (*sang i mihak*). It is 3½ ells (*dara'*) long, and 2½ *dara'* [3½ ?] 1½ *tasú* broad, and its thickness is 3 *tasú*.† I ordered clever stone-cutters to engrave

\* This idea is not new. Thus the *tárikh* of the birth of the Emperor Humáyún given in the *Akbarnámah*, is (metre, *short Ramal*)—

سال مولود همایونش هست زادك الله تعالى قدرا

برده ام يك الف از تاريخش تاكشم ميل دوچشم بدرا

The year of his august (humáyún) birth lies in the words 'May God Almighty increase thy worth!' [914 A. H.]; but I have removed an Alif from the *tárikh*, in order to blind with it the evil eye.

This gives 913 A. H. Humáyún was born on Monday night, 4th Zí Qa'dah, 913.

The letter Alif looks like a needle.

† Assuming Mr. Carlleyle's measurements to be correct (Archæological Report, IV, p. 132), we would have to alter the breadth, 2½ *dara'* 1½ *tasú*, given in the *Tuzuk*, to 3½ *dara'* 1½ *tasú*. In that case we have—

3 *tasú* in *Tuzuk* = 6 inch. measured by Mr. Carlleyle.

or 1 *tasú* = 2 inches.



upon the sides suitable verses. They have also made feet for it of the same kind of stone. I sit very often on it."

The text of the inscription on the stone is taken from Mr. Beale's *Miftāh uttawārikh* (p. 207), as it agrees with the text in the Transactions of the Archæological Society of Agra, 1874. "The stone is at present cracked in two—the cause of the fissure is unknown." (Metre, *khafif*.)

پادشاه که تیغ او سازد \* چون دویکر مرعدو بدونیم  
 باشد این تختگاه فرخنده \* تکیه گاه خدیگان کریم  
 محک خسروان پایتخت ملک \* مهر و مہرا عیاربرز و سیم  
 در درجہ امثل بدرتابندہ \* لولوی بے بہا چو در بتیم  
 پیغ تاریخ او بہ فکرشدم \* مددے جسم از خدای حکیم  
 نالک تختگاه خورشید است \* گفت ماند سریر شاه سلیم

1. (He is) a king whose sword cuts the head of the enemy into two halves like the Gemini.

2. May this auspicious throne be a seat (pr. a place to lean on) for the generous king.

3. A touchstone for the grandees (who form) the basis of the kingdom, and a test for the sun and the moon upon gold and silver.\*

4. It is like a shining moon in the darkness of night; a priceless pearl like a unique gem.†

and 3½ *dara'* in *Tuzuk* = 127½ inch. measured by Mr. Carlleyle = 63½ *tasū*.

∴ 1 *dara'* = 16½ *tasū*, = 16½ *tasū* nearly.

= 33 inch. nearly

and again 3½ *dara'* 1½ *tasū* = 118 inch. measured by Mr. Carlleyle = 59 *tasū*.

∴ 1 *dara'* = 16½ *tasū*.

= 33 inch. nearly.

But that 1 *tasū* = 2 inch. seems improbable from other measurements, and I do not think that the measurements as given in Sayyid Ahmad's edition of the *Tuzuk* are correct, unless indeed 1 *dara'* = 1 *ilāhī gaz*. *Vide* also *Tuzuk*, p. 234.

\* The metre shews that we have to read *mulk*, kingdom, and not *malak*, angels, as translated by Mr. Carlleyle and in the Agra Transactions. "A test for the sun and the moon upon gold and silver," means a test for gold and silver, in allusion to Jahāngir's opinion that the stone was a kind of touchstone (*kasantī*). The stone is called "a touchstone for the grandees, the basis of the kingdom," because their gathering round it proved, in the eyes of the rebellious Shāh Salīm, their faithfulness.

† Mr. Carlleyle, who has not seen where the inscription commences, read this distich—

مسند با صفا ز نور و ضیا      گوهر بے بہا چو در یتیم

A clean seat from its light and brilliancy, a priceless jewel like a unique pearl.—which is metrically correct.



building was being erected, Prince Khusrau rebelled, and I was obliged to go to Láhor. The architects in the meantime went on building after their taste. Afterwards, various sums had to be expended, till the whole amount estimated for had been spent. They had been three or four years at work, when I ordered clever architects, who were assisted by experienced people, to build up several parts as I had before directed. Gradually a noble edifice arose, and a splendid garden was laid out round about the mausoleum. Gates of great height, with minarets of polished (*pardákhtah*) white marble were also made. In all, 15 lacs of Rupees, *i. e.* 50,000 tománs as current in Persia, or 45 lacs Khánís, as current in Túrán, were spent on the building. People called the building after me.'

Mírzá Aflátún, son of Mírzá Yúsuf Khán, was for some time Mutawallí of Akbar's tomb. He died at Sikandrah.\*

Akbar's tomb, as is well known, is in a vault below the ground floor, and bears no inscription.† "The mortuary hall is nearly 38 feet square, and is surrounded by other chambers of smaller size containing tombs of less distinguished members of the Imperial family." Mr. Beale‡ mentions the tombs of Arám Bánú and Shukrunnisá Begam, both daughters of the emperor; but there are several others without name. Near Shukrunnisá's tomb is the tomb of Sulaimán Shikoh, son of Sháh 'Álam Pádisháh, who died in A. H. 1253 (4th February, 1838).

The marble enclosure on the top of the building contains the *jawáb* of Akbar's tomb, made of single marble block, with the words *Alláhu Akbar* and *jalla jaláluhu* inscribed on the head and foot, and round about it are the "ninety-nine beautiful names of God" (*asmá i husná*). The inscription on the walls of the enclosure§ makes no mention of the Prophet, and thus harmonizes with Akbar's religious views, whilst it at the same time completely refutes the story of Akbar's "conversion on the deathbed." It consists of 36 distichs (metre, *Mutaqárib*)—

بنام شهنشاه ملك قدّم • كه ذاتش مبرا بود از عدم  
همه پادشاهان روی زمین • از و صاحب تاج و تخت و نگین  
كند از عدم آشكارا وجود • بود ذات او مظهر عدل و جود  
ز لطفش كه و مه طلبگار كام • بود درگهش قبله خاص و عام  
نگارنده جوهر آب و خاك • طرازند گوهر جان پاك

\* Kín Translation, I, 347.

† Vide Keene's Agra Hand-book, p. 49.

‡ Miftáh, p. 211.

§ The common story is, that the inscription is taken from a poem composed by Shaikh Faizí and Abulfazl. The translation will show that this is impossible; besides Faizí died ten years, and Abulfazl three years, before Akbar.



دو عالم ز فیض ازل آفرید • یکم کرد پنهان و دیگر پدید  
 به بخشیده آنگه سرای سپنج • بشاهان با افسر و تاج و گنج  
 که از عدل ایشان شود روزگار • شکفته تر از باغ در نوبهار  
 ره داوری را چو گیرند پیش • شناسند بیگانه را همچو خویش  
 شهر کوچنیز است در روزگار • بود سایه ذات پروردگار  
 ز نه صد فزون بود شصت و دو سال • که شاه اکبر آن سایه ذوالجلال  
 ببالای زرینه مسند نشست • که بر تخت او گشت افلاک پست  
 جهان را بیلواست از عدل و داد • دل اهل عالم از او گشت شاد  
 بر پایه تختش از هر گروه • شده جمع مردان صاحب شکوه  
 بهر او فکند نظر سوی خاک • بگوهر شده بهتر از جان پاک  
 گرفته بیک حمله ملکه برزم • بایمای ابرو بداده به بزم  
 چو لطف خدا لطف او عام بود • بهر کار چشمش بانجام بود  
 بدرگاه او هر که برده پناه • چو اندیشه رفت ز ماهی بماه  
 چنان پر شد آوازه اش در جهان • که در دل نه گنجید راز نهان  
 بپرداخت آن گونه روی زمین • که کرد آفرینش جهان آفرین  
 بگیتی دو افزون ز پنججاه سال • چنین کرد شاهی ز روی جلال  
 چو از عدل آباد کرد این جهان • سوی آن جهان رفت روشن روان  
 شه هفت کشور ازین پیش بود • کنون هشت جنت مسخر نمود  
 به نزد خردمند هشیار دل • سرای است این عالم آب و گل  
 معجز مهر از جوهر نه سپهر • که با کس بیایان نبردست مهر  
 سپهر است پر کینه مهرش مدار • که با کینه ور مهر ناید به کار  
 جهان است مانند موج مراب • ازان تشنه دل کی شود کامیاب  
 نه بست است پیمان بکس روزگار • که نشکست آن را بهنگام کار  
 نماند به گیتی کس جاودان • ز دست اجل کس نبردست جان  
 چه خوش گفت آن کامل نیکه سنج • که از گوهر دانش اندوخت گنج  
 جهان ای برادر نه ماند بکس • دل اندر جهان آفرین بند و نس  
 شد از عدل شاه اکبر کامگار • بسان بهشت برین روزگار  
 جهان گشت خرم بدوران او • زمین و زمان شد بفرمان او  
 و در دهر مهر پیمان گسل • ز کین مهر او کرد بیرون زدل  
 ز تاثیر مهری این جهان • روان شد سوی عالم جاودان  
 روانش همیشه ز حق شاد باد • ازو عالم قدس آباد باد



1. In the name of the King of kings, the ruler of eternity, whose being is exempt from non-existence !
2. All kings on earth hold crown and throne and signet from Him.
3. Out of non-existence He produces existence ; His nature reveals justice and generosity.
4. Great and small, in consequence of His goodness, are solicitous of His bounty ; His throne is the cynosure of the elect and the people.
5. He designed the essence of water and of earth ; he created the pure nature of the soul.
6. He created two worlds in His eternal kindness ; one He concealed and the other He showed.
7. At the same time He bestowed the transitory world upon kings\* together with the crown, the royal cap, and the treasury,
8. So that through their justice flourishing ages might surpass the bloom of a garden in spring ;
9. And, whilst choosing the path of justice, they might look upon strangers as upon themselves.
10. A king who in his age lives in this manner, is indeed the shadow of God.
11. It was in 962,† that Sháh Akbar, the glorious,
12. Sat on the golden cushion, which on his throne became a lower heaven.
13. He adorned the world with his justice and equity, and the hearts of the people of the world became glad through him.
14. At the foot of his throne eminent men of all nations gathered.
15. If he cast in love a glance on the ground, its (the ground's) essence became better than that of the pure soul.
16. He took kingdoms in war on the first attack, and in the twinkling of an eye again gave them away at feasts.
17. As God's kindness, so was his kindness general ; and his eye perceived the end of every affair.
18. Whoever took refuge at his throne, rose like thought (rises) from the fish to the moon.‡
19. His fame filled so entirely the whole world, that no one's heart could conceal a secret.§
20. He rendered the face of the earth so bright, that even the Creator praised him.
21. He thus ruled for more than fifty-two years on earth ;
22. And because by means of his justice he had rendered this world prosperous, he went a bright spirit to the next world.
23. Before, he was a king of the seven climes ; he has now subjugated the eight paradises.
24. In the eyes of wise men of sense, this perishable world is a Sarái.
25. Do not expect to find kindness in fate ; for in the end fate shews kindness to no one.

\* In allusion to Akbar's ideas of the divine right of kings.

† This should be 963.

‡ *Vide* above, p. 208, l. 6.

§ A hyperbole. If a man had a secret in his heart, Akbar's fame displaced the secret and took sole possession of the man's whole heart.



26. Fate is spiteful, do not love it ; for love is wasted on the spiteful.
27. The world is like the wave you see in a mirage : it can never satisfy the thirsty heart.
28. Fate has kept faith with no one, but breaks its promise at the time of need.
29. No one remains for ever in this world, and no one has freed life from death's grasp.
30. How well said the eloquent sage [the poet Sa'di], in the jewel of whose wisdom he\* found a treasure,
31. "The world, O brother, remains with no one : cling with thy soul to the Creator, and that is enough."
32. But although the age through the justice of Sháh Akbar, the fortunate, became like the highest paradise,
33. And although the world was happy in his time, and earth and age yielded to his rule,
34. Unfeeling and word-breaking fate spitefully removed its love to him from its heart.
35. However, fate's want of love led him to eternal life.
36. May his soul for ever rejoice in his Creator, may the world of holiness brighten through him !

The wall surrounding the garden has four gates, but only the south gate is kept open. To both sides of the latter is a Persian inscription in Tugh-rá characters. Within the gate the following inscription is found (metre, *Mutaqárib*)—

بفرمان شاهنشہ ذوالجلال • کہ باشد شہنشاہیش بے زوال  
شد آراستہ آن چنان روزگار • کہ حیران شد ہندیشہ ہوشیار  
بگیتی بفیض ازل پادشاہ • بود سایۂ نور ذات الہ  
چو از دہر آن سایہ گرد نہان • فتد سایۂ دیگر اندر جہان  
بدینسان بود تا سرانجام کار • بہ نزد خرد گردش روزگار  
زمانہ دگرگون شود ہر نفس • نگردد بیک گونہ با هیچ کس  
فلک رتبہ شاہ اکبر عرش گاہ • کہ از ہیبتش کوہ گشتہ چو گاہ  
نشستہ چو بر تخت شاہنشہی • گرفتہ جہان فر ظل الہی  
فروزندہ افسر و تخت بود • کریم و رحیم وجوان تخت بود  
دل روشن و جان آگاہ داشت • جہان خورد و داد و گرفت و گذاشت  
بباغ جہان تخم نیکی بکشت • بر آن گرفت از ریاض بہشت  
روانش چو انوار خورشید و ماہ • فروزندہ بادا ز نور الہ

1. During the rule of the illustrious king—may his kingdom never wane !—
2. The world was so adorned, that the thoughts of the wise were confounded.

\* Akbar, who liked Sa'di's Gulistán. Aín Translation, Vol. I, 103.



3. A king, by the eternal will of God, is in this world the shadow of the light of God's being.

4. When that shadow disappears from the world, another shadow falls on the world.

5. In this way, in the opinion of the wise, will ages revolve till the end of all things.

6. The world changes every moment, and remains for no one unchanged.

7. When the divine Sháh Akbar, who is now in the highest heaven and whose terror changed rocks to chaff,

8. Sat upon the throne of royalty, the glory of God's shadow surrounded the earth.

9. He conferred lustre upon crown and throne; he was generous, merciful, and successful.

10. He was clear-sighted and wise: he enjoyed and gave away, he conquered and left the world.

11. He sowed the seed of goodness in the garden of the world, and reaped the fruit of it in the gardens of paradise.

12. May his soul shine like the rays of the sun and moon in the light of God!

The following three verses are on the northern side of the gate (metre, *Khafiy*)—

شاه اکبر ز روی دانائی • کرد طاهر ز دهر فانی دست  
دولتش بود بی زوال ازان • دل بدنیـای با زوال نبست  
مرغ روحش چو بود طایر عرش • رفت و بر آشیان خویش نشست

1. Sháh Akbar in his wisdom washed his hands of the transitory world.

2. His power remained unchanged, because he did not cling to this changeable world.

3. As his spirit was a bird of the highest heaven, it went away and returned to its nest.

On the front of the entrance facing the north, Mr. Beale found the following inscription\* in Nasta'liq characters (metre, *Muzá'iri*)—

طاقه که از رواق نهم چرخ برتر است • روشن ز سایه اش رخ تابنده اختر است  
این طاق زیب نه فلک و هفت کشور است • از روضه منوره شاه اکبر است

1. This is a portico which is higher than the portico of the ninth heaven; its shadow illuminates the face of the shining star.

2. This portico is the ornament of the nine heavens and the seven climes: it is the shining Mausoleum of Sháh Akbar.

Mr. Keene mentions that Sikandrah was completed in the 7th year of Jahángir's reign, or A. D. 1612-13.

\* Mr. Beale says (Miftáh, p. 209), "The inscription has never been read, because it is so high." He gives, however, the first verse. Mr. Keene says—"On the frieze round the great gateway are other poetical inscriptions in the Persian language, setting forth the praises of the monarch and the mausoleum." The writing, according to Mr. Keene, is by a calligrapher of the name of 'Abdul Haq Shírází.



## Kachpu'rwa', near A'grah.

In the village of Kachpúrwa' (کچھ پوروا), about a mile from the Rauzah of I'timád uddaulah, towards the east, on the left bank of the Jamuná, a dilapidated Masjid stands, which was built "by order of the emperor Humáyún" at the expense of the historian Shaikh Zainuddín of Khawáf,\* Çadr of the empire and one of Bábar's literary friends. The inscription is of interest as it belongs to the first year of Humáyún's reign, as he ascended the throne on the 6th Jumáda I., 937.

شه عرصه دين محمد همایون • كه بنياد قدرش بود فرق گردون  
بفرمان عالي بحكم رفيعش • مرتب شد اين فرش و اين سقف ميمون  
بتاريخ اتمام اين بيت .. شه عرصه دين محمد همایون

1. The king of the domain of faith (is) M u h a m m a d H u m á y ú n, the basis of whose worth is the vortex of the revolving heaven.

2. At his high command and exalted decree, this auspicious floor and roof were made.

3. As date of the completion of this house...[one word illegible], 'The king of the domain of faith, M u h a m m a d H u m á y ú n.' A. H. 937 (A. D. 1531.)

The writer and composer is Saháb-ulhádí.

A second inscription is on the left hand wall (*Rubá'í* metre)—

اين بقعه بود چون دل صوفي صافي • انكار صفـاي اوست بے انصافي  
چون يافت بسعي زين خافي اتمام • تاريخ شدش بسعي زين الخافي  
آمرزش يابد آنكه .... رازي را ياد كند قابله و راقمه مهاب

1. This religious edifice is pure like the heart of a Súfí. To deny its purity were injustice.

2. As it was completed at the expense of Z a i n o f K h á f, its date lies in the words 'at the expense of Z a i n t h e K h á f í.'

Pardoned may be he who remembers (two words illegible). The composer and writer is Saháb.

A description of this mosque and a plan will be found in the Arch. Report, IV, p. 100 and Pl. xii.†

Zainuddín of Kháf, or Khawáf, is mentioned in the following extract from Akbarnámah (Lucknow edition, I, p. 147)—

\* The meaning of the word صعي clearly shews this. Regarding the town of Khawáf, or Kháf, *vide* Aín Translation, I. 445.

† Mr. Carlleyle's reading of the inscription makes no sense. I have, therefore, given Mr. Beale's reading. Mr. Carlleyle has not recognized in زين the name of the builder, and instead of reading Zain [uddín], he reads zin, 'by this' and translates 'Khawáf' by 'veiling.'



"Of the men of learning whom his late Majesty, the emperor Bábar, honored with his personal friendship, were the following—(1) Mír Abul Baqá, who reached a high degree of knowledge in philology and philosophy. (2) Shaikh Zain Çadr, great-grandson of Shaikh Zainuddín Khawáfí,\* who was well up in science, a smart critic, acquainted with poetry and prose writing. He was always in the emperor's company, and was raised by the emperor Humáyún to the rank of Amír. (3) Abul Wájid, poetically styled 'Fárigí,' the maternal uncle (*khál*) of Shaikh Zain, an agreeable and humorous companion, fond of making verses. (4) Sultán Muhammad Kosah ('the bald'), witty, and well acquainted with poetry, who had been a companion of the renowned Mír 'Alí Sher. (5) Mauláná Shiháb, the riddle writer, poetically styled 'Haqírí,' well acquainted with science, and no mean poet. (6) Mauláná Yúsuf Tabíb, whom the emperor called from Khurásán, an excellent man. (7) Surkh Widáí Kuhnah, a little known poet, who wrote poems in Turkish and Persian. (8) Mullá Baqáí, a distinguished poet, who wrote in honor of Bábar a *Maṣnawí* in the metre in which Nizámí had written his '*Makhzan*.' (9) Khwájah Nizámuddín 'Alí Khalífah,† a wise counsellor and faithful friend, well acquainted with medicine. (10) Mír Darwísh Muhammad Sár-bán, the pupil and favourite of Náçiruddín Khwájah Ahrár, a much-liked companion and confidant of the emperor. (11) Khwánd Mír, the historian, learned and agreeable, and famous for his historical works, as the '*Ḥabíb ussiyar*,' the '*Khulācat ul-Akhbár*,' the '*Dastúr ul-Wuzará*,' &c. (12) Khwájah Kalán Beg, a great Amír and friend of the emperor, a man of great tact and eminent acquirements. His brother Kíchak Khwájah was holder of the signet and a confidant of the emperor. (13) Sultán Muhammad, of the Duldai clan, a great Amír and a pleasant companion."

Of greater importance is the following passage which I translate from Badáoní (I, p. 471):—

"Another (man of renown) was Wafáí, the *nom-de-plume* of the well-known Shaikh Zainuddín Kháfí, who held the post of Çadr under Bábar. *He built a Mosque in A'grah and a Madrasah, which lie on the other side of the Jamuná.* He was a talented man, and eminent in riddles, history, extemporaneous verse making, in poetry, all other minor branches of poetry and prose, and in letter writing. \* \* \* He wrote a history on the conquest of Hindústán (by Bábar) and the extraordinary circumstances that accompanied it. He displays in it his power over the language. He died in the neighbourhood of Çhanār in 940 [A. D. 1533-34], and was buried in the Madrasah he had built."

The History written by Zainuddín Kháfí is mentioned by Prof. Dowson in Elliot's *Historians*, No. V, pp. 288 to 292. Badáoní's remark proves

\* Regarding him *vide* A'in Translation, I, p. 592n.

† *Vide* A'in Translation, Vol. I, p. 420.



the correctness of Prof. Dowson's identification and supplies the biographical particulars which were wanting in Elliot's MS.

Neither Mr. Beale nor Mr. Carlleyle mentions Zain's Madrasah.

In front of Shaikh Zain's mosque, Mr. Beale saw several tombs. He copied the following inscriptions.

نوبسته عنچہ ز گلستان جهان برفت • وز شاخ سار عمر علي نو جوان برفت  
 باشد هزار حیف کہ نقد حیات ما • بردل نہادہ داغ فراق از جهان برفت  
 الحکم لله وفات عالیشان مرحوم خواجہ .... خواجہ معین الدین احمد ....  
 رمضان سنہ ۹۸۶ •

The first two lines require revision, and I have not translated them. The last line is—

To decree belongs to God. The distinguished and pardoned Khwājah ['Alī, son of] Khwājah Mu'īnuddīn Ahmad died on the... Ramazān, 968 [July, 1560].

This must have been a younger son of the Khwājah Mu'īnuddīn Ahmad, one of Akbar's grandees, whose biography is given in my A'in Translation, I, 434. Mu'in was governor of A'grah in 1560.

On another tomb, Mr. Beale saw the following (metre, *short hazaj*)—

زیزدان ہدیہ بود آن نکونام • ازینسان تحفہ خواندش .....  
 چو بودہ ذکر نامش بر زبانم • تسلی بخش جان نانوائم  
 گرفتم حال از تکرار نامش • بتاریخ شہادت ..... . . . . .

1. This person of good fame was a present from God ; and for this reason every .. called him 'Tuhfah' ['a present'].

2. As the mention of his name, which brings consolation to my weak spirit, was on my lips,

3. I obtained from twice repeating his name the date of his death.

Hence we have to double the word *tuhfah*, i. e.  $2 \times 493 = 986$  A. H., or A. D. 1578.

#### Sarjī'pu'r, near A'grah.

Mr. Beale says—'There was a Sarāi in the village of Sarjīpūr (سرچی پور) in Madiā Kaṭrah (مدیا کترو) about  $2\frac{1}{2}$  miles from the fort of A'grah. A few years ago it was demolished, and the material was carried away to build the present District Jail of A'grah. The gate of the jail was built with the material taken from the gate of the Sarāi. The inscription on the top of the gate still remains as before.'



لا اله الا الله      بسم الله الرحمن الرحيم      محمد رسول الله  
 در سنه بیست و سیوم محمد شاه پادشاه غازي اطلال الله ملکه و سلطانه در سنه بکهزار  
 و یکصد و پنجاه و چهار هجری بنده میروجه الدین خان مخاطب به میرجلال  
 الدین خان ولد میرجلال الدین خان مرحوم اکبرآبادی ابن میرسید محمد ابن  
 سرای را برای آرام مسافری بنا نموده بهر آینده و رونده جسنة اله بدعاء خیر یاد  
 نمایند و السلام علی محمد و آله و اصحابه اجمعین باهتمام سدا سیوناراین \*

In the name of God, the merciful, the clement! There is no God but Allah; Muhammad is Allah's Prophet. In the 23rd year of the reign of Muhammad Sháh Padisháh i Ghází—may God lengthen his kingdom and rule!—in 1154 A. H. [A. D. 1741-2], the slave Mír Wajíh uddín Khán, whose title is Mír Jaláluddín Khán, son of the late Mír Jaláluddín Khán, of Agrah, son of Mír Sayyid Muhammad, built this Sarái, for the comfort of travellers, for the future and the present a pious deed done to God. May people remember (the builder) with a pious wish! And blessings upon Muhammad and his house and all his companions!

Under the superintendence of Sadá Shiv Náráyan.

#### Nárnaul, S. W. of Dihlí.

Mr. Delmerick has sent me a reading of the following inscription from the tomb of Ibráhím Khán Súr, the grandfather of the emperor Sher Sháh.

عمارت که کرد از کسے از تو پرسد \* جوابش بده گرتودانی رازی  
 بنا کرد این گنبد عرش پایه \* شه مملکت شیر سلطان غازي  
 سرسروان مالک هفت کشور \* که نیغش ز برق جهان برد بازی  
 فرید حسن سورین ابرهیم \* بفرمود بر قبرجد خلد سازی  
 چوپرسی ز من کار فرما که بودش \* ابا بکر بن شیخ احمد نیازی  
 نیازی بمعمیم تخصیص کندي \* بدین ذات پاکش بود سرفرازی

1. If any one asks you who made this building, give him the answer if thou knowest the secret:

2. This dome, whose foundation is the highest heaven, was built by the king of the country, Sher [Sháh], the victorious ruler,

3. The chief of chiefs, the lord of the seven realms, whose sword surpasses the flash of the lightning.

4. Faríd,\* son of Hasan Súr, son of Ibráhím, ordered a beautiful vault to be built over the grave of his grandfather.

5. If you ask me who was the superintendent, (I say it was) Abá Bakr, son of Shaikh Ahmad, the Niyází.

6. If I use the general term, I may call him a Niyází, but if I use the special term, I must call him a Kindí, and this reflects honor on his pure character.

\* Sher Sháh's name was Faríduddín.



The inscription does not seem to be complete, and in the fourth line the metre is violated. The histories do not mention the year in which Ibráhím Khán Súr died; but that he died at Nárnaul is known from the Hon'ble E. C. Bayley's translation of the *Túrikh i Sher-Sháhi* in Dowson, IV, p. 309.

I take the following remarks on Nárnaul from my geographical notebook :

Ná r n a u l belongs to the old district of Dhundhotí,\* which corresponds almost entirely to the tract which Muhammadan historians call Mewát. The latter term has perhaps a wider extent, as it includes the old Sirkárs of Rewárá, Alwar, and Tijárah, being bounded in the north-west by Bikánír, in the south by Amber-Jaipur, and in the east by the Súbahs of Ágrah and Dihlí. Sirkár Nárnaul itself consisted at Akbar's time of 16 mahalls, viz. Bábái, Barodah Ra'ná, Chál Kalánah (Kalyánah), Jhújyún, Singhánah-Udaipur, Kanaudha, Kot-Putlí, Kánorí, Khandelá, Khodáná, Lápoṭí, the Dáman i koh, Nárnaul, and Narhar. The town of Nárnaul itself, says Abul Fazl, has a stone fort, and near it is an intermittent spring. South-west of it lies Bághor, founded by Bach Deo.† The Sirkár had several copper-mines, especially at Bábái, Singhánah-Udaipur, Bhándarah in Kot-Putlí, and Ráipur in the Dáman i Koh, with copper mints at Singhánah and Ráipur.‡ The district contained numerous sayurghál, or rent-free, tenures. Thus in Mahall Nárnaul itself, the area of which is given by Abul Fazl at 214,218 big'hahs and the revenue at 147,830 Akbarsháhi Rupees, the rent-free lands are put down at Rs. 13,754. The Mews, or Mewátis, the inhabitants of Mewát, are frequently mentioned by early Muhammadan historians as turbulent; and the emperor Balban especially had continually to wage war with them, often with doubtful success. The earliest settlement of the Muhammadans at Nárnaul itself, which legends ascribe to Shaikh Muhammad Turk, provoked hostilities, which culminated in A. H. 642, or A. D. 1245, in the massacre at the 'Id festival of all Muhammadans that lived in the town. Shaikh Muhammad Turk, too, fell a victim, and his life and miracles and meritorious death still attract pilgrims to the tomb of the Nárnaul martyr.

But Nárnaul is not mentioned by Dihlí historians before 814 (A. D. 1411), when Khizr Khán plundered the country, and a few years later, in 838 (A. D. 1424-35), when Nárnaul was given to Sidh Pál and Sadháran K'hatri, the murderers of Mubarak Sháh, as jágír. During the reign of the Lodís, Ibráhím Khán Súr obtained a few villages as jágír for the maintenance of forty horses. He died in Nárnaul, as has been men-

\* Elliot, *Races of the N. W.*, by Beames, I, 82.

† Cunningham, *Arch. Report*, I, 154.

‡ Thomas, *'Chronicles'*, p. 416.



tioned above. When his grandson Sher Sháh drove Humáyún from India, Nárnaul was held by Majnún Khán Qáqshál. He was besieged by Háji Khán, one of Sher Sháh's best officers; but through the exertion of Rájá Bihári Mall of Amber the town was spared, and Majnún Khán was allowed to evacuate the fort and retreat with his soldiers to the west. Háji Khán occupied Nárnaul, and held it during the reigns of Sher Sháh's successors. He was driven from it, in the first year after Akbar's accession, in 963 (A. D. 1556), by Tardí Beg, Akbar's governor of Dihlí.\* In the end of the 8th year of Akbar's reign, Nárnaul, which had been included in the *khalsa* lands of the empire, was given to Shujá't Khán as jágír.† He left his son Qawim Khán as commandant of the fort, whilst Mír Gesú was the imperial collector. The town was suddenly attacked and plundered by the fugitive Sháh Abul Ma'álí, Humáyún's favorite, upon whose head Akbar had set a high prize. Qawim Khán fled, and Mír Gesú was killed. On the approach of an imperial detachment, Sháh Abul Ma'álí fled with the treasure to Hiçár Fíruzah.

The next event of importance, mentioned in the histories, is the Nárnaul rebellion, which broke out in the beginning of the 15th year of Aurangzib's reign, in 1082 A. H., or A. D. 1671, caused no doubt by the imposition of the *jizyah* and the emperor's crusades against Hindú temples. Kháfí Khán (II, 252) gives the following account.

'In Nárnaul District and other places in Mewát, there was a sect of Hindús, who called themselves 'Satnám s.' They are also known as the Múndiah sect, and consisted of four or five thousand families. Although they dressed like faqirs, they carried on trade and agriculture, or lived as petty merchants. According to their tenets, they wished to obtain the rank of 'men of fair fame,' and this is the meaning of the word *sat-nám*. They were scrupulously honest in their dealings; but if any one oppressed them, they would not suffer it, and hence they used to go about armed. About the time that Aurangzib returned from Hasan Abdál, it happened that a peasant in the neighbourhood of Nárnaul got into a quarrel with one of the collector's peons, who had been sent there to watch the harvest. From words it came to blows, and the peon killed the peasant. Other peasants collected, attacked the peon, and left him lying lifeless on the ground. The collector then sent a number of peons to bring the peasants to account; but the Satnáms mustered in force, wounded several of the peons, and drove them away. Kár Talab Khán,‡ the faujdár of Nárnaul, sent the collector a detachment of horse and foot; but the Satnáms put them to flight. The Faujdár now collected the troops of the district, got assistance from the

\* *Áin Translation*, I, p. 319.

† *Akbarnámah*, II, 252, and *Áin Translation*, I, 371.

‡ The *Maás*. 'Álamgírí (p. 115) calls him Tahir Khán.



zamíndárs of the neighbourhood, and moved at last personally against the rebels. He was, however, defeated in several engagements and had to withdraw, when the town of Nárnaul was occupied by the Satnáms, who made immediate arrangements to collect the taxes and establish thánahs all over the district.

‘ When the emperor returned to Dihlí, he heard of the rebellion, and sent off several detachments, every one of which was routed, so much so that the rumour spread that neither sword nor arrow nor bullet could hurt a Satnám, whilst every arrow and bullet of the rebels killed two or three imperialists. In fact, every one believed that the Satnáms practised witchcraft. The most extraordinary things were related of them. Thus it was said that they possessed an enchanted wooden horse upon which a woman rode, and the horse used to go like a live horse in front of their vanguard. Matters went so far that Rájás of renown and Amírs experienced in warfare had to be despatched against them with strong detachments; but the soldiers were so unwilling to march on, that the rebels came within sixteen or seventeen *kos* of Dihlí. Several zamíndárs and mean Rájpúts joined them to escape taxation, and the revolt assumed such dimensions, that the emperor left the palace and ordered the tents to be pitched outside the capital. He also wrote formulas of blessings and amulets with his own hands, and had them sewn on the flags and banners, and then sent the soldiers against the rebels. At last, after great exertions on the part of Rájá Bishn Singh,\* Hámid Khán (son of Murtazá Khán), and other intrepid Amírs, several thousands of the rebels were killed; the rest dispersed, and the rebellion ended.

‘ But as so many zamíndárs had taken part in the rebellion, the whole Súbah of Ajmír and even the neighbourhood of Ágrah were unsettled; and the tents having been pitched outside the capital, the emperor resolved to perform a pilgrimage to the shrine of Mu‘ínuddín Chishtí at Ajmír, intending at the same time to punish the refractory zamíndárs. But before leaving, he gave orders to levy the *jizyah* from the Hindú population of the capital, as well as from the Hindús in all other Súbahs. When the orders were published, the Hindús—you might have counted them by lacs—collected below the window where the emperor used to show himself to the people, and loudly bewailed their poverty and cried loud to get the order rescinded; but his Majesty paid no attention to the clamour. But when, on the next Friday, the emperor went from the palace to the Jámí’ Mosque to say prayers, the Hindú money-changers, cloth merchants, and other tradesmen had assembled in such numbers as to block up every street. The emperor waited an hour, thinking the people would let him pass; at last he gave orders to move on, and several people were trampled to death by the elephants or

\* The chief commander, however, was Ra’dandáz Khán (the ‘thunder-thrower’), an officer in Aurangzib’s artillery.



ridden over by the horses. For several days, the Hindús assembled in large numbers ; but at last they gave in and paid the *jizyah*.'

Some of the dispersed Satnáms, adds the author of the *Tazkirah i Saláfin i Chaghtái*, had the boldness to enter Dihlí ; and when the report came to the ears of the emperor, he ordered the Superintendent of Police (*shihnah*), Sidi Fúlád Khán, to hunt them down. About seventy or eighty had taken possession of some ruined buildings in the Habshípúrah Quarter. They defended themselves for several hours, but were at last all killed, and Sidi Fúlád hung their dead bodies on the trees round about the town. He received the thanks of the emperor, and the Satnáms were heard of no more. Ra'dandáz Khán received the title of Shujá't 'Alí Khán, was promoted and got a kettledrum.

During the reign of Sháh 'Álam Bahádur,\* Aurangzib's son, the rebellion in Súbah Ajmír continued, and Sayyid Ghairat Khán, Faujdár of Nárnaul, was killed.

In the 6th year of Farrukh Siyar's reign, A. H. 1129, or A. D. 1717, Çalábat Khán was Faujdár of Nárnaul.

The biographical works on Muhammadan Saints and Mr. Beale's *Miftáh uttawárikh* mention the following men of note—(1) Shaikh Muhammad Turk, who had come from Turkistán to Nárnaul. As mentioned above, he was killed in A. H. 642, or A. D. 1244-45. (2) Shaikh Ahmad Majd Shaibání, a holy man, born at Nárnaul. He died at Nágór in 927, or A. D. 1521. (3) Shaikh Ilahdín Majzúb, a faqír, died 946, or A. D. 1539. (4) Shaikh Hamzah, of Dháráú, 3 kos from Nárnaul ; died in 957, or A. D. 1550. (5 and 6) Shaikh Ismá'il, a learned man ; and his younger brother Shaikh Nizám, a saint of renown, died in 997, or A. D. 1589 (Áin Translation, I, p. 538, and Badáoní, III, 26). (7) Walí Muhammad, died 5th Shawwál, 1057, or 1647. (8) Sayyid Ni'matullah, who left Nárnaul for Rájmahall, where he was much honored by Prince Shujá'. He lived at Fírúzpúr, east of Rájmahall, and died there in 1077 or 1080, A. D. 1666 or 1669.

Nárnaul is also the home of the family to which the Hindústání poet Afsos belongs. He says in the preface to his poems that he traces his descent from Imám Ja'far Çádiq. Sayyid Badruddín, brother of Sayyid 'Alamuddín 'Hájí Khání,† one of the poet's ancestors came from Khawáf in Khurásán to Nárnaul. Sayyid Ghulám Muçţafá, grandfather of the poet, moved during the reign of Muhammad Sháh from Nárnaul to Dihlí, where Sayyid 'Alí Muzaffar Khán, Afsos's father, entered the service of Amír Khán. Mír Sher 'Alí, known under the poetical name of Afsos, was born at Dihlí.

\* Called 'Bahádur Sháh' in European histories.

† This seems to mean that he was in the service of Hájí Khán, Sher Sháh's officer, who, as mentioned above, was many years in Nárnaul. Regarding Afsos, vide also Sprenger's Catalogue of Oudh MSS., pp. 198, 597.



Mr. Blochmann then mentioned that Major-General Cunningham, C. S. I., Director-General of the Archæological Survey of India, had sent to the Society another batch of Muhammadan inscriptions, *viz.* four from Burhánpúr, and seven from Asírgarh, for publication. Among them was a Sanskrit Inscription, a free translation of the Arabic inscription attached to the Jámi' Mosque of 'Ádil Sháh II. Fárúqi, of A. H. 997.

The following papers were read—

1. *Notes on Sháh Ismá'il Ghází, with a sketch of the contents of a Persian MS., entitled "Risálat ush-Shuhadá," found at Káñtá Dúár, Rangpúr.*—By G. H. DAMANT, B. A., C. S.

(Abstract.)

There are four Dargáhs, or shrines, in Rangpúr, erected to the memory of Sháh Ismá'il Ghází. They are all situate a few miles to the north-east of G'horág'hát, in thánah Pirganj. The principal one is at Káñtá Dúár. About three miles west is another at a place called Jalá Maqám. These two dargáhs are under the care of the same faqír, who has a large jágír and claims to be descendant of one of the servants of Ismá'il, who came with him from Arabia. The head of the saint is said to be buried at Káñtá Dúár, and his body at Madáran, in Jahánábád, west of Húglí.

Mr. Damant found the MS. in the possession of the faqír of Káñtá Dúár. He assured him it had been in the possession of his family for many generations, but he was unable to read it, and was quite ignorant of the contents. The short facts as given in the MS. are, that in the time of Bárbak Sháh, Ismá'il came to Gaur, where he gained the favour of the king by building a bridge or embankment across the great marsh, east of Gaur. He was then sent against Gajpatí, king of Madáran, or Orísá, whom he utterly defeated, and lastly, he fought two battles with Kámesar, king of Kámrúp. The king finally tendered his allegiance, and consented to pay tribute, though it does not appear that the country was regularly occupied by the Musalmáns. The Hindú governor of G'horág'hát appears to have been envious of Ismá'il's fame, and falsely charged him with entering into an alliance with the king of Kámrúp. A force was sent against Ismá'il, and he was beheaded in the year 878, which would bring his death to the end of the reign of Bárbak Sháh.

The account given in the MS. corresponds most strangely in many particulars with the legend which Mr. Blochmann heard at Húglí (*see Asiatic Society's Proceedings*, April, 1870, page 117). In that legend, Ismá'il is said to have invaded Orísá with success, and to have been falsely accused by a Hindú of attempting to set up an independent kingdom at Madáran, and on this false charge to have been beheaded by order of the king. We



may, I think, on this double authority, take these two statements to be established facts.

The only difference between the two legends is this, that the Húglí legend refers the whole to the reign of Husain Sháh, i. e. about thirty or forty years later.

The history was written by Shaikh Pír Muhammad Shaṭṭá'í in 1042, or A. D. 1633, during the reign of Sháhjahán.

Mr. Damant's essay and the text of the MS. will appear in No. III. of Pt. I. of the Journal for this year.

2. *On the Temple of Jaysággar, Upper Ásám.*—By J. M. FOSTER, F. S. A., *Názirah, Ásám.*

(Abstract.)

This paper is accompanied with two photographs of the Jaysággar Temple, several plans, and plates of the architectural ornaments. The temple was built by Rudra Singh, *alias* Chuckungpha, in memory of the heroic death of his mother. Rudra Singh, whose father Ghadhádhār Singh had been the last Buddhistic king of Ásám, adopted the Hindú faith from the commencement of his reign in 1695, A. D.

Mr. Foster's essay with several plates will be published in Journal, Pt. I., No. IV., for 1874.

Mr. Blochmann drew the attention of the members to some of the architectural ornaments, many of which were Muhammadan in design, especially the winged fairies in Course F., and the fairy on horseback, which looked exactly like the pictures he had seen in MSS. of the Prophet when sitting on the 'Buráq' and ascending to heaven.

3. *On the Supposed Identity of the Greeks with the Yavanas of the Sanskrit Writers.*—By RA'JENDRALÁ'LA MITRA.

(Abstract.)

The author reviews the opinions of various Sanskrit scholars on the meaning of the word 'Yavana.' Whilst several of them attribute to it, more or less distinctly, the meaning of 'western foreigners,' Dr. Kern in his preface to the *Brihat Sañhitá* maintains that 'Yavana' signifies 'a Greek and a Greek only.' It is, therefore, necessary that the whole question should be re-examined. For this purpose, the writer has collected passages from the Egyptian, Hebrew, Assyrian, and pre-classic Greek, where the forms Uinim, Jáván, Javnán, and Ionian occur, and he shews that in these passages, as also in the Io legend, the word 'Ionian' refers to a mixed population or 'ancient Eurasians'. He then enumerates the passages from Páṇini, Manu, the *Mahábhárata*, *Vishṇu Purána*, the *Vis'wamitra* legend in the *Rámáyana*, *Karna Parva*, and many other Sanskrit works, where the Yavanas are mentioned. He also discusses the similar passages



in the As'oka edicts, and shews that of all Greek kings, Alexander the Great not excluded, only one, *viz.* Antiochos Theos, *whose dominions reached to the Indus*, is called a Yavana, or Yoná. Further, he proves that the Hindus did not borrow a single astronomical term direct from the Greeks, and that the opinion advanced by Weber and Kern on the existence of Sanskrit translations of astronomical works written by four Greek writers is untenable, whilst the list of words common to Sanskrit and Greek, given by Weber, proved the existence of no influence of Greek on Sanskrit.

The only conclusions which would be consistent and tenable are—

1st. That originally the term Yavana was the name of a country and of its people to the west of Kandahár—which may have been Arabia, or Persia, or Medea, or Assyria,—probably the last.

2nd. That subsequently it became the name of all those places.

3rd. That at a later date it indicated all the casteless races to the west of the Indus, including the Arabs and the Asiatic Greeks and the Egyptians.

4th. That the Indo-Greek kings of Afghánistán were also probably indicated by the same name.

5th. That there is not a tittle of evidence to show that it was at any one time the exclusive name of the Greeks.

6th. That it is impossible now to infer from the use of the term Yavana the exact nationality indicated in Sanskrit works.

The essay will appear in No. III, of Part I of the Journal for 1874.

The Hon'ble E. C. Bayley made some remarks on the subject. Without for the present questioning Bábu Rájendralála Mitra's general conclusions, and while fully admitting that the word 'Yavana' was often used in a vague sense and might be rendered as 'foreigners,' or at any rate 'western foreigners,' he yet demurred to the conclusions drawn from As'oká's inscriptions. It seemed to him that the natural inference from the facts was directly opposite to that which in the opinion of the writer flowed from them, and that in this instance at least, if in no other, the term 'Yavana' or rather 'Yona,' could hardly be rendered otherwise than a 'Greek or a Grecian.'

4. *On Embolocephalus ceratophthalmus—the type of a new genus and species of Isopod Crustaceans.*—By JAS. WOOD-MASON.

This paper will be published in the Journal, Part II, No. 4, 1874.

5. *Some Ornithological Notes and Corrections.*—By W. E. BROOKS, C. E.

This paper will be published in the Journal Part II, No. 4, 1874.



6. *Descriptions of new species of Helicida of the genera Helix and Acabstina from the Khasi Hills and Manipur.*—By Major H. H. GODWIS-AUSTES, F. G. R. S.

This paper will be published in Journal Part II, No. 2. 1875.

The meeting then was adjourned.

#### LIBRARY.

The following additions have been made to the Library since the meeting held in August last.

#### *Presentations.*

##### •• Names of Donors in Capitals.

The Journal of the Royal Asiatic Society of Great Britain and Ireland. Vol. VII, Part I.

##### ASIATIC SOCIETY OF GREAT BRITAIN.

Philosophical Transactions of the Royal Society of London for 1873, Vol. 163, Parts I, and II.

Official List of the Royal Society of London, ending 30th Nov. 1873.

Proceedings of the Royal Society of London Vol. XXII, Nos. 152 and 153.

*J. N. Hennessey*: Note on the Periodicity of Rainfall.—*W. Roberts M. D.*: Studies on Biogenesis.—*Prof. Osborne Reynolds*: On the Refraction of Sound by the Atmosphere.—*N. Moseley*: On the Structure and Development of *Peripatus capensis*.—*J. Tyndall*: Further Experiments on the Transmission of Sound.

##### ROYAL SOCIETY OF LONDON.

Proceedings of the Institution of Mechanical Engineers of Birmingham, for October 1873, and January and April 1874.

*C. C. Walker*: Description of a Wrought Iron Construction of Observatory for maintaining equality of internal and external temperature.—*A. B. Brown*: On Hydraulic Machinery for steering, reversing and discharging cargo &c., in steamships.—*H. M. Morrison*: On the Transmission of Water Power by Turbines and Wire Ropes.

##### INSTITUTION OF MECHANICAL ENGINEERS.

Transactions of the Royal Society of Edinburgh Vol. XXVII, Pt. I.

*J. A. Ewing and J. G. Macgregor*: On the Electrical Conductivity of certain Saline Solutions, with a Note on the Density.—*J. Dewar and I. G. M'Kendrick, M. D.*: On the Physiological Action of Light.

Proceedings of the Royal Society of Edinburgh. Session 1872-73.

*D. H. Marshall*: Note on the rate of decrease of Electric Conductivity with increase of temperature.

##### THE ROYAL SOCIETY OF EDINBURGH.



Transactions of the Zoological Society of London, Vol. VIII, Parts 7 and 8.

*J. Anderson*: On the Osteology and Dentition of *Hylomys*.—*Prof. G. J. Allmann*: Report on the Hydroids collected during the Expeditions of H. M. S. 'Porcupine.'

THE ZOOLOGICAL SOCIETY OF LONDON.

The Anatomy of the Lymphatic System. By Dr. E. Klein.

THE ROYAL SOCIETY OF LONDON.

Proceedings of the Scientific Meetings of the Zoological Society of London, Part III, 1873, and Part I, 1874.

THE ZOOLOGICAL SOCIETY OF LONDON.

Proceedings of the Literary and Philosophical Society of Manchester. Vols. 8 to 12.

LITERARY AND PHILOSOPHICAL SOCIETY OF MANCHESTER.

Journal of the Chemical Society, Nos. 134 to 139, with a Supplement.

*R. Apjohn*: On the Analysis of a Meteoric Stone, and the Detection of Vanadium in it.—*A. Schrauf*: Schröckingerite, a New Mineral from Joachimsthal.—*R. W. Van Gorkom*: Cinchona Cultivation in Java.—*J. Kolbe*: Amount of Real Acid in Sulphuric Acid of various densities.—*H. Caron*: New Method of Tempering Steel. Regeneration of Burnt Iron.—*F. L. Sonnenschein*: New Test for Blood and Examination of Blood Stains.—*F. Fischer*: Contamination of a Well by the waste from a Gaswork.—*A. F. Hargreaves*: On the Spontaneous Combustibility of Charcoal.—*C. R. A. Wright and J. Lambert*: On Cajuput Oil. On the action of Pentasulphide of Phosphorus on Terpenes and their Derivatives.

Geographical Magazine. Edited by C. R. Markham, C. B., F. R. S.

THE EDITOR.

Proceedings of the Royal Geographical Society. Vol. XVIII, No. III.

Indian Government Mission to the Atalik-Ghazi, Letters from Mr. T. D. Forsyth.—*Watson*: Journey in Yezo in 1873, and progress of Geography in Japan.—*Dilks*: Valley of the Ili and the Water System of Russian Turkistan.

ROYAL GEOGRAPHICAL SOCIETY OF LONDON.

Journal of the Statistical Society. Vol. XXXVII, Part II, 1874.

STATISTICAL SOCIETY OF LONDON.

Memoirs of the Peabody Academy of Science Vol. I. Nos. I, II, III.

First to Fifth Annual Reports of the Trustees of the Peabody Academy of Science.

The American Naturalist, a popular illustrated magazine of Natural History. Edited A. S. Packard, E. T. Marre, A. Hyatt, and F. W. Putnam. Vol. I to VII, and No. 1, of 1874.

PEABODY ACADEMY OF SCIENCE.

Proceedings of the American Academy of Arts and Science. Vol. VIII.

AMERICAN ACADEMY OF ARTS AND SCIENCES.



Annual Report of the Board of Regents of the Smithsonian Institution for 1871, 2 copies.

Smithsonian Miscellaneous Collections. Vol. X.

SMITHSONIAN INSTITUTION.

Transactions of the Connecticut Academy of Arts and Sciences, Vol. II, Part 2.

CONNECTICUT ACADEMY.

Proceedings of the Californian Academy of Sciences, Vols. I and V.

CALIFORNIAN ACADEMY.

Second Annual Report of the Board of Managers of the Zoological Society of Philadelphia.

ZOOLOGICAL SOCIETY OF PHILADELPHIA.

The Complete Works of Count Rumford. Vol. II.

AMERICAN ACADEMY OF ARTS AND SCIENCES.

Report of the United States Geological Survey for 1872, by F. V. Boyden, United States Geologist. (2 copies.)

THE AUTHOR.

First, second, and third Annual Reports of the United States Geological Survey for 1867, 1868, 1869.

Report of the Chief Signal Officer to the Secretary of War (United States) for the year 1872. (2 copies.)

Synopsis of the Acrididæ of North America, by Cyrus Thomas.

Contributions to the Extinct Vertebrate Fauna of the Western Territories (United States), by Joseph Leidy.

Monthly Reports on the Commerce and Navigation of the United States for the year ended June 30, 1872.

Annual Reports of the Geological Survey of Indiana for 1871 and 1872, by E. T. Con, State Geologist, with maps in a separate Volume.

List of Elevations in the portion of the United States West of the Mississippi River. Collated and arranged by Henry Garnet.

Meteorological Observations for the year 1872, in Utah, Idaho, and Montana (United States).

The United States Sanitary Commission in the Valley of the Mississippi, during the War of the Rebellion, 1861-1866.

THE GOVERNMENT OF THE UNITED STATES.

Mittheilungen der Schweizerischen Entomologischen Gesellschaft. Vol. IV, No. 4.

ENTOMOLOGICAL SOCIETY OF SWITZERLAND.

Mittheilungen der Anthropologischen Gesellschaft in Wien. Vol. III.

ANTHROPOLOGICAL SOCIETY OF VIENNA.

Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften. Mathematisch-Naturwissenschaftliche Classe. Vol. 67, No. 4 and 5, and Vol. 68, Nos. 1 and 2.



Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften, Philosophisch-Historische Classe. Vol. 74, No. 1 to 3.

THE ACADEMY OF VIENNA.

Sitzungsberichte der philosophisch-philologischen und historischen Classe der K. Akademie der Wissenschaften zu München, Nos. 3 to 5, 1872; and Nos. 1 to 4, 1873 and Mathematisch-physikalischen Classe, 1-3, 1873.

*Hübschmann*: Avestastudien.—*Haug*: Ueber eine Arabische Siegelinschrift aus vorchristlicher Zeit.—*Ethé*: Firdúsi als Lyriker.—*Herm. v. Schlagintweit-Sakiniński*: Reisen in Indien und Hochasien.—*Plath*: Das Kriegswesen der alten Chinesen.—*L. A. Buchner*: Ueber die Löslichkeit der arsenigen Säure im Wasser.—*Erlenmeyer*: Ueber die Bestandtheile des Arnicawassers und des ätherischen Arnicaöles.—*Vogel*: Ueber das Verhalten der Milch zum Lakmusfarbstoff.

Archiv für Österreichische Geschichte, Vol. 50, Pt. II, and Vol. 51, Pt. I.

Monatsbericht der Königlich Preussischen Akademie der Wissenschaften zu Berlin, April to July 1874.

Verhandlung der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien. Vol. XXIII.

THE I. R. ZOOLOGICAL AND BOTANICAL SOCIETY OF VIENNA.

Mémoires de la Société Nationale des Sciences Naturelles de Cherbourg. Vol. XVIII.

NATIONAL SCIENTIFIC SOCIETY OF CHERBOURG.

Journal Asiatique. Vol. III, Nos. 2, and 3.

ASIATIC SOCIETY OF PARIS.

Bulletin de la Société de Géographie, from May to July 1874.

*Fedorchenko*: Le Khanat de Khokand et les contrées avoisinantes.—*V. A. Mallo-Brun*: Voyage en Russie, en Caucase et en Perse, par T. M. Chevalier Lycklama à Nyëholt.

GEOGRAPHICAL SOCIETY OF PARIS.

Bulletins de la Société d'Anthropologie de Paris, 4th to 6th Fasc. 1873.

*Royer*: De l'origine des diverses races humaines, et de la aryenne en particulier.

ANTHROPOLOGICAL SOCIETY OF PARIS.

Mémoires de l'Académie Impériale des Sciences de St. Petersburg. Vol. XX, No. 8 to 10; Vol. XX, Nos. 1 to 5; Vol. XXI, Nos. 1 to 5.

Bulletin de l'Académie Impériale des Sciences de St. Petersburg. Vol. XVIII. Nos. 3 to 5; Vol. XIX, Nos. 1 to 3.

IMPERIAL ACADEMY OF SCIENCES OF ST. PETERSBURG.

Verhandlungen der K. K. Geologischen Reichsanstalt, Nos. 11 and 14, 1873, and No. 1 of 1874.

Jahrbuch der Kaiserlich-Königlich Geologischen Reichsanstalt, Vol. XXIII, No. 3 and 4, and Vol. XXIV, No. 4.

GEOLOGICAL SOCIETY OF VIENNA.



Denkschriften der Kaiserlichen Akademie der Wissenschaften, Philosophisch-Historische Classe, Vol. XXII.

IMPERIAL ACADEMY OF SCIENCES OF VIENNA.

Die Fauna der Schichten mit *Aspidoceras Acanthicum*. By Dr. Neumayr.

Das Gebirge um Hallstatt. By Edmund Mojsisovics v. Mojsvar.

GEOLOGICAL INSTITUTE OF VIENNA.

Bulletin de la Société Impériale des Naturalistes de Moscow, No. 3

IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW.

Zeitschrift der Deutschen Morgenländischen Gesellschaft, Vol. XXVIII, No. 50.

GERMAN ORIENTAL SOCIETY.

Abhandlungen der Mathematisch-Physikalischen Classe der Königlich Bayerischen Akademie der Wissenschaften. Vol. XI, Pt. 2.

Abhandlungen der Historischen Classe der Königlich Bayerischen Akademie der Wissenschaften. Vol. XII, P. I.

Abhandlungen der Philosophisch-Philologischen Classe der Königlich Bayerischen Akademie der Wissenschaften. Vol. XIII, Pt. I.

ACADEMY OF MUNICH.

La Langue et la Littérature Hindoustanie, by M. Garcin de Tassy.

THE AUTHOR.

Annual Report of the Sanitary Commissioner for the Central Provinces, for 1873.

Report on the Forest Administration of the C. Provinces, for 1873-74.

Report on Vaccine Operations in the Central Provinces, for 1873-74.

Report on the Excise Revenue in the Central Provinces, for 1873-74.

CHIEF COMMISSIONER OF THE CENTRAL PROVINCES.

Report on the Sanitary Administration of the Panjáb, for 1873.

Report on the Meteorology of the Panjáb, for 1873.

LIEUT. GOVERNOR OF THE PANJAB.

Report on Public Instruction in the Madras Presidency, for 1872-73.

THE GOVT. OF MADRAS.

Review of the Revenue Administration of the Central Provinces, for 1873-74.

Report on the Jails in the Central Provinces, for 1873.

Report on Education in the Central Provinces, for 1873.

Report on the working of the Government Charitable Institutions in the Central Provinces, for 1873-74.

CHIEF COMMISSIONER OF THE CENTRAL PROVINCES.

Report of the Sanitary Commissioner for Bengal, for 1872.

Report on the Calcutta Medical Institutions, for 1873.

Specimens of Languages of India, including those of the Aboriginal Tribes of Bengal, the Central Provinces, and the Eastern Frontier.



Correspondence relating to the Famine in Bengal and Behar, 1873-74, together with Minutes by Sir Richard Temple, K. C. S. I.

GOVERNMENT OF BENGAL.

Flora Sylvatica for Southern India. By Major R. H. Beddome.

GOVERNMENT OF MADRAS.

Vichar Ságar. By Sharíf Salím Ahmad.

THE EDITOR.

The Calcutta Journal of Medicine, Nos. 6 and 7, for June and July, 1874.

THE EDITOR.

Professional Papers on Indian Engineering (second series). Edited by Major A. M. Long, R. E., Principal, Thomason Civil Engineering College, Roorkee.

THE EDITOR.

Vaishnava-vrata-Dina-Nirnaya. By Navadvipachandra Vidyaratna Goswami.

THE AUTHOR.

Ramayan, 4th Vol, No. 5.

EDITOR.

The Kamándakiya Nitisástra.

SIRDAR ATAR SINGH, CHIEF OF BHADOUR.

Records of the Geological Survey of India, Vol. VII, Part, 3 and 4, 1874.

SUPDT. OF THE GEOLOGICAL SURVEY.

Instructions for the Electrical Testing of Lines and Offices. Part III, Section I. By Louis Schwendler.

THE AUTHOR.

Notices of Sanskrit MSS., No. VIII, Vol. III, Part I. By Rájendralála Mitra.

THE EDITOR.

Exercises in the Lushai Dialect. By Captain T. H. Lewin.

THE AUTHOR.

Memoirs of the Geological Survey of India. Vol. I, 1874.

SUPDT. OF GEOLOGICAL SURVEY OF INDIA.

The Christian Spectator, Nos. 38 to 40.

THE EDITOR.

Scientific Lectures in Hindí. By Lakshmi Sankar Mísra, M. A.

THE AUTHOR.

Hindu Music.

THE AUTHOR.

The Indian Antiquary, for August, September, and October, 1874.

THE GOVERNMENT OF INDIA.



Translation of a Memoir by M. A. Levol on Alloys of Silver and Copper and their Chemical Composition.

THE AUTHOR.

On the Garo Hills. By Major H. H. Godwin-Austen, F. R. G. S.

THE AUTHOR.

Report on Sanskrit MSS., 1872-73. By G. Bühler.

THE AUTHOR.

A Dissertation on the Sabbath and on Tidal Motions, by Maulawí Karámat 'Alí, al-Husainí, Mutawallí of the Húglí Imámbárá.

THE AUTHOR.

#### *Purchase.*

The Annals and Magazine of Natural History, 80 Vol. 14.

*W. T. Blandford*: Description of new Reptiles and Amphibia from Persia and Baluchistan.—*Albert Günther*: A contribution to the Fauna of the River Tigris.—*M. C. Eohir*: Observations on the Fecundation of the Batrachia Urodela.—*H. J. Carter*: On the Nature of the Seed-like Body of *Spongilla*, on the Origin or Mother Cell of the Spicule, and on the Presence of Spermatzoa in the Spongider.—*A. G. Butler*: Descriptions of two new species of *Fulgora* from India.—*Arthur Viscount Walden*: Descriptions of some new Species of Birds.—*Dr. Richard Grief*: *Pelomyxa palustris*, a freshwater Amœboid Organism.—*Arthur Viscount Walden*: On *Megapodius trinkutensis*, Sharpe.—*M. A. Giard*: On the structure of the Caudal Appendage of some Ascidian Larvæ. On Parthenogenesis in Ferns.—*Prof. O. C. Marsh*: Small size of the Brain in Tertiary Mammals.

The London, Edinburgh, and Dublin Philosophical Magazine, and Journal of Science, Nos. 313 to 316.

*James Dewar*: On the Physical Constants of Hydrogenium.—*F. Kohlrausch*: Determination of the Absolute Value of the Siemen's Mercury Unit Electrical Resistance.—*Dr. W. B. Carpenter*: On the Physical Cause of Ocean Currents.—*F. Kohlrausch*: A Variation—Barometer.—*J. A. Fleming*: On the new Contact Theory of the Galvanic ball.—*Thomas T. P. Bruce Warren*: On Warren's Method of finding Faults in Insulated Wires.—*Oliver Heaviside*: On Telegraphic signalling with Condensers.—*James Croll*: On the Physical Cause of Ocean-Currents.—*Baron N. Schilling*: The Constant Currents in the air and in the sea: an attempt to refer them to a common cause.—*Robert Mallet*: Tidal Retardation of the Earth's Rotation.—*William Crookes*: On Attraction and Repulsion accompanying Radiation.—*James O'Kinealy*: Fourier's Theorem.—*Louis Schwendler*: On the General Theory of Duplex Telegraphy.

The Numismatic Chronicle and Journal of the Numismatic Society, No. LIII. 1874.

Journal of the Society of Arts and Institutions in Union, and Official Record of the International Exhibitions, Nos. 1102 to 1125 (1108 wanting).

Quarterly Journal of Microscopic Science. No. LV, July 1874.



*Dr. Michael Foster*: On the Term Endothelium.—*Ernest Haeckel*: The Gastraea Theory, the Phylogenetic Classification of the Animal Kingdom and the Homology of the Germ-Lamellæ.—*Rev. M. J. Berkeley*: On the Etiology of the Madura.

The Quarterly Journal of Science. No. XLIII. July, 1874.

The Polar Star and the Pointers.—Modern Researches in Tropical Zoology.

The Ibis, a Quarterly Journal of Ornithology. Vol. IV, No. 15.

*Andrew Anderson*: On the Nidification of certain Indian Birds.—*R. Swinhoe*: Notes on Chinese Ornithology.—*Arthur Viscount Walden*: A reply to Mr. Allan Hume's Review of 'Die Papageien' of Dr. Otto Finsch.

The Edinburgh Review, Nos. 284 and 285, April and July, 1874.

The Quarterly Review, Nos. 272 and 273, April and July, 1874.

Westminster Review, July, 1874.

Contributions to Solar Physics. By J. Norman Lockyer, F. R. S.

Thesaurus Entomologicus Oxoniensis, or Illustrations of new, rare, and interesting Insects. By J. O. Westwood, M. A.

The American Journal of Science and Arts. Vol. VII, Nos. 40 to 41, and No. 43, of Vol. VIII.

*C. F. Himes*: Preparation of Photographic Dry-Plates by daylight, by desensitizing and re-sensitizing the silver compounds.—*John Trowbridge*: On a Molecular Change produced by the passage of Electrical Currents through iron and steel bars.—*J. S. Newberry*: Parallelism of coal seams.

History of India, by T. Wheeler, Vol. III.

Bleek's Comparative Grammar, Vol. I.

Revue des Deux Mondes, from 15th April to 1st August 1874.

Comptes Rendus Hebdomadaires des Séances de L'Académie des Sciences, Vol. LXXVIII. No. 14 to 26 and Vol. LXXIX, No. 1 to 4.

Revue Archéologique, Nos. 4 to 6, 1874.

Journal des Savants, for April and May, 1874.

Revue et Magasin de Zoologie, Vol. II, Nos. 3 to 6.

Revue Linguistique, Vol. VI, Fasc. IV.

Mélanges 'Archéologie Egyptienne et Assyrienne, Vol. I, Fas. IV.

Actes de la Société Philologique, Vol. IV, No. 5.

Biblische Legenden der Muselmänner, by Dr. B. Weil.

Culturgeschichte in ihrer Natürlichen Entwicklung bis zur Gegenwart.—By Friedrich von Hellwald, Nos. 1 to 4.

Aristotles' Metaphysic, by Dr. D. B. Schfüter.

Coleopterologische Hefte, No. XI and XII. By E. V. Harrold.

Flexiones Pracriticæ in editione sua Sacuntalæ. By Dr. Carolus Burkhard.

Schulgrammatik und Sprachwissenschaft. By Dr. J. Jolly.



Beiträge zur vergleichenden Casuslehre des Zend und Sanskrit, by  
Georg Orterer.

Das Christliche Adambuch des Morgenlandes. By A. Dillmann.

Das Buch Henoch. By A. Dillmann.

Calcutta Review, for October 1874.

Pratna Kamra Nandini, or the Hindu Commentator, No. 3 to 4.

*Exchange.*

Athenæum for June and July 1874.

Nature, Nos. 247 to 255, 1874.

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PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR DECEMBER, 1874.

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The monthly General Meeting of the Society was held on Wednesday, the 2nd instant, at 9 o'clock P. M.

Col. H. Hyde, President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table—

1. A Silver Medal from the Royal University of Norway.

The following letter from the Chief Secretary of the University accompanied the donation :—

‘I have the honor to recommend to your special attention the bearer of this letter, Rev. Dr. Vibe, Chaplain of the King. I beg you give him also a friendly recommendation for his purpose to the authorities of the Indian Government.

‘Repeating the grateful thanks of the Royal University of Norway for the many valuable publications, which we have received from the Asiatic Society of Bengal, I beg you to accept the following medal as a token of our great esteem.’

From W. Duthoit, Esq., C. S.—five Muhammadan silver coins.

The following letter accompanied the donation :—

*Benares, 25th November, 1874.*

DEAR SIR,—I have your No. 548 dated 13th current and by to-day’s parcel post forward to your address *two* rupees of Jalál-uddín Firúz Sháh Khiljí and three of Mu’izzuddin Kaiqubád—in all 5 coins, kindly acknowledge their receipt.

‘If you wish to see where they were found and will take up a good map of the Mírzápúr District, please follow the course of the Sona from west to east till you come to Agori Khás—then a little further to the east you will see the Bijol river flowing into the Sona, and a little further still the Rehand. The coins were found at a spot near the Sona bank between the Bijol and the Rehand.



'At Agori there is now a very picturesque Fort, and near it, just over the Bijol, is a very picturesque temple (Somnáth). Agori was once a place of much trading importance. The temple was planted by Agorwálá banias who were the chief of the Agori merchants, and is still a place of pilgrimage and very sacred to this class. The Fort belongs to the Agori Barhor Ráj, now under the management of the Court of Wards.'

The following gentlemen, duly proposed and seconded at the last meeting, were elected ordinary members—

Maulawi Khuda Baksh Khan Sahib, Bankipur, (Patna); Babu Ram Das Sen, Berhampur; Captain M. Protheroe, Port Blair; R. E. Egerton, Esq., Lahore.

The following are candidates for ballot at the next meeting—

John Sutherland Gunn, M. B., Surgeon, Bengal Army, proposed by Mr. J. Wood-Mason, seconded by Mr. H. Blochmann.

Captain C. J. F. S. Forbes, Deputy Commissioner, Shwgygyeen (British Burma) proposed by Col. Hamilton, seconded by Col. H. Hyde.

Richard Lydekker, Esq., B. A. Geological Survey of India, proposed by Mr. H. B. Medlicott, seconded by Mr. J. Wood-Mason.

Babu Shyama Charan Sarkar, has intimated his desire to withdraw from the Society.

The President announced that the Council have elected Dr. T. R. Lewis to be a member of their body *vice* Mr. Geoghegan, who has left India, and Babu Prannath Pandit a member of the Philological Committee.

Also that the Council have sanctioned the continuance of the pension of Rs. 3 per month, to Islam Khan, lately a taxidermist attached to the Museum, for a further period of one year, subject to reconsideration at the expiration of that time.

The following papers were read—

1. *Note on two apparently undescribed species of Goat from Northern India and a new species of Dove from the Nicobar Islands.* By ALLAN O. HUME, C. B.

In recently preparing, for the use of friends collecting them for me, a brief paper on the horns of India, I found in my collection two species that appear to be unnamed.

The first is the Suleyman Range Makhore, which differs conspicuously from *Capra megaceros* of Cashmere, in that while the horns of the latter resemble a corkscrew, those of the former are more like an ordinary screw. I have called this species *Capra Jerdoni*.

The second is the Sindh Ibex which does not, to my idea, agree at all with the descriptions or plates of *Capra Caucasica* to which it is usually referred; I have called this *Capra Blythi*.



I do not at all feel sure that these species are undescribed, but I could find no names for them and had to provide names, and as I have published them elsewhere, think it right, to prevent confusion, to put them on record in a scientific Journal.

I may also take this occasion to mention that in my account of the birds of the Nicobars and Andamans, I noticed that I had obtained at the latter Islands, a small dove, resembling *Turtur humilis*, but as I believed different.

I have since obtained a really good specimen which has convinced me that it is distinct, and I wish to take this opportunity of characterizing it.

*TURTUR HUMILIOR, sp. nov.*

Length, 9; Wing, 5, 6; Tail, 3·3; Bill, at front, (from where the feathers end), 0·55; Tarsus, 0·75.

? *Female*.—Head greyish-brown paling on forehead. Rump deep slatey, rest of upper parts, breast and middle of abdomen brown, with a broad black half-collar, on the back of the neck, and a more or less venaceous tinge on the lower parts; wing-lining, sides and flanks deep slatey-grey.

I had no specimens to compare it with, so sent it to Mr. Brooks, he remarks. "I have never seen any dove like the Andaman one you have sent.

"Its characteristic points are—1, the broad collar; 2, (and the most important) the dark slate coloured wing-lining; 3, the very brown hue. Its wing is much longer than that of *T. humilis* ♂ which has a pale wing-lining and is quite a differently toned bird. It is of similar size to *T. cambayensis*, but has a much longer wing. It is very much smaller than ♂ *risoria* which has a light wing-lining and the brownest *risoria* is quite pale compared with this dusky Andaman dove."

I hope to figure this sombre little Dove later, in the mean time this will serve to call attention to it.

2. *Description of a new species of Helicidæ of the genera Helix and Achatina, from the Khasi Hills and Manipur.*—By MAJOR H. H. GODWIN-AUSTEN, F. Z. S.

This paper will be published in the Journal, Part II, 1875, with illustration.

3. *Notes on the Transit of Venus of 1874.*—By CAPTAIN W. M. CAMPBELL, R. E.; communicated by CAPTAIN J. WATERHOUSE.

The following brief notes regarding the preparations being made in this country to observe the rare and important phenomenon of the Transit of Venus, may be of interest to the Society.

The observations will be made at Roorkee in the North-West Provinces by Col. J. F. Tennant, R. E., assisted by Captains W. M. Campbell of



the G. T. Survey and J. Waterhouse, Assistant Surveyor General, with Sergt. J. Harrold, R. E., and two men of H. M.'s 55th Regt. as assistant photographers.

The instrumental equipment of the party consists of—

1st.—A very fine 6-in. Equatorial by Cooke and Sons.

2nd.—A new 36-inch Theodolite by Troughton and Simms, lately sent out for the G. T. Survey and lent for the occasion.

3rd.—A Photo-heliograph by Dallmeyer.

4th.—A quadruple Chronograph.

5th.—An Astronomical Clock which marks the time in seconds on the chronograph and, also by electricity, shows time on three dials, one of which is placed close beside each of the three principal instruments.

For the shelter and accommodation of the instruments a temporary Observatory has been built comprising a room for the standard clock, chronograph and transit instrument, with two attached revolving domes for the theodolite and photo-heliograph. In immediate connection with the latter of these domes is a convenient dark-room for the preparation of the photographic plates. The equatorial is in a separate detached revolving dome.

The equatorial will be used by Colonel Tennant, who will observe the contacts, take measurements between the cusps of Venus, while she overlaps the sun's limb, with a double-image micrometer, and also probably micrometrical measurements of her position throughout the Transit.

He may also use the transit instrument to determine time by daylight transits of bright stars during the phenomenon.

Captain Campbell will use the 36-in. theodolite to observe the contacts, and throughout the Transit he will take observations of the planet's position on the sun's disc, by means of a succession of transits of sun and planet, recorded with the chronograph.

Captain Waterhouse will take photographs on six-inch plates, with a solar image of about 4 inches in diameter, in the photo-heliograph at intervals of two minutes nearly throughout the Transit. He will also, by means of an apparatus constructed by Mr. Warren de la Rue on the principle first proposed by M. Janssen, the eminent French astronomer, and known as the "Janssen slide," endeavour to obtain a series of pictures of the sun's limb and planet together for some seconds, before and after the moment of each of the last three contacts, and also about the times of bisection. It may be explained that the Janssen slide is an ingenious arrangement for carrying a revolving circular sensitive plate about 11" in diameter in such a manner that small radial segments near the circumference may be successively exposed to light at intervals of about one second, thus enabling 60 small pictures of any specific part of the sun's image to be taken in the course of a minute, forming an annular belt about  $1\frac{1}{4}$  inch wide round the circumfer-



ence of the plate. The number of photographs taken will probably be about 120 besides 6 of the Janssen plates. The ordinary wet process will be used, the dry plates proposed to be used by other observing parties not having been found to work satisfactorily.

Captain W. J. Heaviside, R. E., of the G. T. Survey is expected to join the party for a few days, and he will also observe the contacts with a fairly powerful telescope.

Arrangements have been made for instantaneously recording on the chronograph the time of exposure of each photograph and of each of the 60 pictures taken on a Janssen plate.

All time observations will be recorded on the chronograph.

This instrument consists of clock-work, driving four wheels, over each of which a long tape of paper (such as used in telegraph offices) is passed and drawn out by friction at a very uniform rate of half an inch per second. On each tape the clock records seconds by means of a pricker worked electrically, while the observer to whom the tape belongs, has in his hand a tappet key, by which he can work at will a second pricker alongside of the first.

In order to trace the clock time on the paper, a mark is omitted at the beginning of each minute.

In addition to the apparatus above described, there is a model of the transit, similar to the one used at Greenwich. The advantage of this is, that with a little practice, the observer becomes familiar with the phenomenon and knows what to expect, or at least gets some notion of it, and fixes his ideas of the exact phase he will seek to observe.

By combined practice with two telescopes, the relative personal equations of the observers are arrived at, and such observations will be repeated after the Transit is over.

Familiarity with the model will also enable an observer to estimate the occurrence of each phase very exactly, so that he can give a signal of warning to others, for instance in the present case, a signal will be given to Capt. Waterhouse for the preparation and exposure of the "Janssen" plate, a matter of great importance, as an error of a few seconds in exposing it would render it useless, and Capt. Waterhouse will have no means of judging the nearness of the contact for himself.

The important phases for observation are :—

1st.—The breaking of the 'black drop' at Ingress.

2nd.—The forming of the same at Egress.

We know that when well inside the sun's limb, Venus will appear to be connected with it by a band of shadow, but we do not know exactly what the behaviour of this band will be, whether it will burst at Ingress, or form at Egress, in a well defined way, or whether it will fade out gradually at Ingress and form slowly at Egress.



To guard against this uncertainty, every one has agreed to observe—

At Ingress. The first distinct lessening of the intensity of shadow between the limbs.

At Egress. The first definite appearance of shadow as intense as the disc of Venus.

After the first there may still remain a shadow less dark than Venus, which will die away gradually; while on the other hand, at Egress, such a shadow may precede the fully black shade.

The two phases above described are the phenomena to be observed, but in addition to them, if it can be done without imperilling their observation, the last and first appearance of shade of any kind must be noted.

The times may also be noted at which it is estimated that the two limbs would just touch, if clearly seen without any distortion, Venus being just within the sun's limb.

Lastly, at Egress, an attempt may be made to note the last contact of the limbs, Venus being outside the sun, *i. e.* the last external contact.

All observations will be useless unless the time is accurately known, and the comparison of the clock or chronometer used, with a clock whose error and rate are well determined both before and after the observations, should form part of the record of the observations.

Or, if the chronometer is compared with daily time signals, the comparison should be continued for one or two days after the Transit and included in the record with the comparison of the preceding days. In any case, the method by which the recorded times are arrived at, should be fully explained, and the observations of all sorts, with full means for testing the whole of the instrumental adjustments. If a transit instrument is used, the Level readings, Collimation tests, &c. and a full description of the instrument must be given.

The telescope used must be described as well as possible, as regards opening of object-glass, focal length, magnifying power, &c.

The place of observation must also be accurately described, or its latitude and longitude given.

NOTE.—The Transit of Venus having taken place since the above was written it may be interesting to state before going to press that the Transit was successfully observed in India, by Col. Tennant's party at Roorkee where 107 six-inch photographs and 5 Janssen plates were taken, with favourable weather; at Lahore by Captain G. Strahan R. E.; at Masûri by Mr. J. B. N. Hennessey, who obtained some interesting results with the spectroscope; at the Surveyor General's Office, Calcutta, where 39 photographs and several eye observations were made; at Muddapur by a party of Italian astronomers under the direction of Sig. Tacchini, the distinguished spectroscopist, and at Kurrachee by General Addision. At Madras the weather proved unfavourable.

Tidings of the observations have also been received from the parties scattered in various parts of the world, mostly satisfactory.



A long time must elapse before any final results can be arrived at, but already many accounts have appeared in the newspapers giving the personal impression left by the event on different observers; and in some respects these are very conflicting.

Some say they saw no appearance of a 'black drop,' while according to others it was most distinct.

The phenomena seemed almost a repetition of model practice in Egypt, according to telegrams in the Times, whereas at Roorkee no resemblance was found, and we learn from other observers in India, using powerful instruments, that they saw no appearance of the 'black drop.' The different appearances must be greatly due to differences of instrumental power and atmospheric conditions, probably the more perfect the instruments, the less the 'black drop' features.

Many observers saw distinctly the whole of Venus, while more than half her disc was outside the sun's limb, her dark outline being fringed with light, and M. Janssen telegraphs from Japan that her disc was seen outside the sun's limb against the corona. Much discussion as to the planet's atmosphere will doubtless arise from this appearance, which seems to be confirmed by some of the photographs.

Other observers, notably the Italian party at Muddapur, found proofs of her atmosphere by means of the spectroscope.

4. *Extracts from a Letter from W. H. DALL, of the U. S. Coast Survey to REV. C. H. A. DALL, M. A., Calcutta.*

*"Unalashka; Alaska Territory;—September 22nd, 1874;—  
United States Coast Survey,—Schooner Yukon.*

"Our work is practically closed for the season, and we start for San Francisco about the end of this month. I commence now a letter, in order that you may have the fullest and earliest account of our doings.... Our work has extended over a large part of the coast of the territory this year. We began by rating chronometers and making some corrections of the charts, at Sitka. Thence we sailed for a very remarkable place called Lituya Bay. This was surveyed by La Perouse in the last century, and is very difficult to get in and out of. Across the narrow entrance the breakers roll continually, except at slack water, in calm weather. La Perouse lost, in this tide bore, two boats and sixteen men. We got in and out by a lucky combination of circumstances; in five days making a reconnaissance of the entrance; which is not correctly represented on the old charts. We came near having trouble with a party of Sitka natives here: they were very insolent, and attempted to board the vessel while we were away surveying; but those left on board fortunately prevented it without bloodshed. These natives are the worst I know. They are well armed and have advanced far enough in civilization to distil their own rum out of molasses which they buy from the traders. They invited one of our party to drink, when he was ashore, and he reported the liquor to be tolerably good. They are also quite fearless, and when opportunity offers, very impudent.

Five large glaciers impinge on this Bay. The upper part of it is a mere rift in mountains 6,000 to 8,000 feet high; and resembles a



Yosemite full of salt water and adorned by glaciers,—but on a grander scale. The highest mountains in North America, and the grandest living glaciers, out of the Arctic and Antarctic Zones—are here.

We made some measurements, the best hitherto obtained, and got a height of about 15,000 feet for Mts. Fairweather and Crillon, with an uncertainty of three hundred feet. The smaller mountains, all about the bay, range from 6,000 to 11,000 feet:—so that the loftiness of the principal peaks is not so apparent as their proximity to the sea would lead one to infer.

Leaving Lituya Bay, we coasted along, finding work at every point.

The charts of this region are very inaccurate. We moved, so to speak, the entire shore-line of America between Lituya Bay and Mount St. Elias, to the westward, from four to six miles (geographical); thus increasing the area of the British possessions in British America by that area, some eight hundred geographical square miles; as the American boundary is a line ten marine leagues from the coast. We have proved the relative accuracy of much of La Perouse's work, as compared with that of later map-makers. We have a reconnaissance of the part of the coast mentioned, sufficiently accurate for a general chart. Our instruments are so much better and our methods so much more exact, that we have been able to improve materially on the work of our predecessors, though they did wonders with their slender means. I cannot describe the sublimity of the scenery of this part of America. In original grandeur it far surpasses Switzerland; at least I am so informed by some who have seen both; and I can well believe it. We surveyed Port Mulgrave, in Admiralty or Bering Bay, and obtained a very fine series of observations for the height of Mount St. Elias; in all sixty-four observations of it from four stations, with a very delicate instrument of Gambey's, reading to five seconds of the arc. Our observations cannot be worked up until we return; as they will require some special corrections for which our tables are not extensive enough; but we have, from rough calculations, data sufficient to infer that the result will be a height in the neighbourhood of 19,000 feet. All previous observations have been made at sea with sextant angles; a very imperfect method, especially when the doubtful nature of a sea position, is taken into account. Hence the great difference between our results and those of some previous explorers. La Perouse had an error of twelve miles in his reckoning, and the Russians one of six miles. The mountain is nearly under the meridian of 141 west, where Captain Cook put it. The peak and about half a mile down the east flank is in American territory; so I suppose we may claim the whole mountain as ours. It is generally supposed that these high mountains are volcanos. With regard to Fairweather, Crillon and St. Elias, I am convinced this supposition is erroneous. There is no cone or crater nor any signs of



one ever having existed on either of them. I could see distinctly the stratification of the rock for two-thirds of the height of St. Elias, which is shaped on one side like an enormous crystal. The summit has, it is true, a sharp peak, but it is like the smaller granite peaks of the Sierras and the mountains of the whole west coast inside the Coast Range properly so called, which runs out in Oregon and Washington Territory. The rock at Lituya was garnetiferous granite, and I saw no volcanic rock there at all. However there are numerous volcanic outlets, mostly cold and dead, among these high mountains, but they are all low and are evidently of subsequent date to the elevation of the range of St. Elias and others.

From Bering Bay we went to Port Etches in Prince William Sound, to Middleton or Otehek Island, and to Kadiak, in the order mentioned. At the last place we rated chronometers.

Middleton is a low island, surrounded by reefs, and we were very fortunate in obtaining a calm day, enabling us to land and get observations without any delay. The vegetation here was very luxuriant. We found one leaf of a skunk-cabbage (which, as you know, usually grows from six to twelve inches high) four feet long and two feet broad and with a stalk four and a half inches thick.

Much of our work this summer lay among islands without harbors or safe anchorages, except in calm weather; and we were especially favoured in the weather we had, when in such localities; in which we were not delayed a day anywhere by rough weather.

After Kadiak we visited Chirikoff Island, once inhabited, and now reported to be full of wild dogs of great ferocity. These were said to be the progeny of some native dogs abandoned there some ten years ago; and a party sent down from Kadiak some years since, to hunt, came back and reported that the ferocity of the assembled dogs, who were congregated on the beach, had deterred them from landing. We therefore approached this island with some curiosity; but saw only one dog, the day after landing, and he ran away before we could come up with him. We next visited the Semidi Islands, a rocky group in deep water without harbors; and then anchored in Chignik Bay. Here we had a good deal of bad weather. I found a good many fossil plants here, mostly Eocene or Miocene in age. There are lignite beds here.

We also obtained a number of reindeer, whose fine juicy meat was an agreeable addition to our sea fare. From hence we went to examine some isolated rocks off the coast of Aliaska Peninsula;—and to a small anchorage near Mitrophania Island; and thence to the Shumagins. Here we did a good deal of work, finishing our reconnaissance of the group begun in 1872. Then a few days were spent in the vicinity of the dreaded Saunakh Reefs;—and we sailed for Unalashka to rate chronometers. Our next point was



St. Paul, one of the Seal Islands, where we obtained a good series of observations, a reconnaissance of the island and magnetic declination, and had a good opportunity of examining the wonderful exhibition of seal-life, now paralleled by no other place on the globe. There are estimated to be four millions of fur-seal on this island; though the means for determining the number are not very decisive. Their habits would fill a volume, and are most interesting and complex.

Hence we sailed for Nunivak Island, where we found Eskimo living, and bought three or four hundred ethnological articles of their make, for use or ornament. I also took eleven skulls from an ancient place of deposit of the dead. These are laid above ground, and covered only with stones and drift-wood. We decided the position and surveyed the anchorage, and, after fixing the west point of the island, sailed for Hagemster Strait, near Cape Newenham. Here we got good observations and then sailed for Port Möller on the north side of the Peninsula of Alaska. Here we had good luck, as usual; beside getting many interesting things out of the ancient shell-heaps, and killing seven reindeer. We discovered some hot springs containing sulphur and alum,—a bed of fine sandstone, well suited for grindstones,—of which we carried off a lot for holystones; and most interesting of all, a deposit of Triassic or Jurassic fossils, containing Belemnites, Ammonites, Inoceramus, Pecten and other fossils. Fine glaciers, active volcanoes, unlimited sandbanks, covered with walrus and hair-seal,—wolves, bears, foxes and hundreds of deer—made up the *tout ensemble* of Port Möller. Wishing to complete the reconnaissance of St. George and Paul, we sailed again for the Pribyloff Islands, and succeeded in getting tolerable observations on St. George, establishing its position thirteen miles west of its location on the present charts. This group has been in doubt for a long time, and it is a matter of satisfaction to me to have been able to settle the question of position. Our bad weather began soon after leaving Port Möller, and has continued almost without interruption to the date of writing.

We reached Unalashka after several stormy days, and since then have been principally engaged in running some twenty miles of shore line, getting our chronometers rated again, and completing our annual (Unalashka) magnetic observations. The Easterly variation is rapidly decreasing here.

The total result of our season's work may be summed up as follows: Seventeen harbour and anchorage charts (reconnaissance) completed. Twelve thousand three hundred and sixteen observations of all kinds taken; including seventy-seven thousand meters of shore line and twenty-five miles of soundings. Astronomical positions twenty-four, fixed by three thousand six hundred and forty-three observations; each including latitude, time and declination. Eight hundred and eighty-four magnetic observations.



Twenty-two ports visited, six thousand miles sailed over,—and this all done excluding the time spent at sea, in sixty-two working days. The probable error of most of our positions will not exceed two-tenths of a second of an arc."

P. S.—dated—" *San Francisco, October 16th, 1874.*"

"We have arrived safely, after a rough but very short passage of thirteen days from Unalashka. Very sorry was I to hear of the death of Dr. Stoliczka. Get for me, if you possibly can, his palæontological volumes of the Indian Survey. Valuable in themselves, they will be especially so to me, as in the last one he adopts my views on the Brachiopods, with some very complimentary remarks.... So busy, I can only add that I go to Washington in a month, to work up the results of our Alaska campaign. Address me there, care of the Smithsonian Institute."

W. H. DALL."

Captain Marsh gave a short account of his travels in Persia and Afghanistan.

#### LIBRARY.

The following additions have been made to the Library since the meeting held in November last.

#### *Presentations.*

\*.\* Names of Donors in Capitals.

Proceedings of the Royal Society of London. Vol. XXII, No. 154.

*Prof. Wyrville Thomson*.—On Dredgings and Deep-sea Soundings in the South Atlantic, in a Letter to Admiral Richards. *J. L. Tapper*.—On the Centre of Motion in the Human Eye. *General Sir Ed. Sabine*.—Contributions to Terrestrial Magnetism. *J. Prestwich*.—Tables of Temperatures of the Sea at various Depths below the Surface, taken between 1749 and 1868; collated and reduced, with Notes and Sections. *J. A. Brown*.—On the Sun-spot period and the Rainfall.

ROYAL SOCIETY OF LONDON.

Proceedings of the Royal Geographical Society. Vol. XVIII, No. IV.

*Carpenter*.—Further Inquiries on Oceanic Circulation. *Schuyler*.—A month's Journey in Kokand in 1873. *Rawlinson*.—Extracts from, and Remarks on, Letters relating to Mr. Forsyth's Mission to Kashgar.

ROYAL GEOGRAPHICAL SOCIETY OF LONDON.



The Quarterly Journal of the Geological Society. Vol. XXX, No. 119.

*R. Etheridge, Jun.*—On the Relationship existing between the *Echinothuridæ*, Wyville Thomson, and the *Perischæchinidæ*, M'Coy.

GEOLOGICAL SOCIETY OF LONDON.

Journal of the East India Association. Vol. VIII, No. 2.

THE EAST INDIA ASSOCIATION.

Geographical Magazine, Nos. IV, V, VI, VII. 1874.

No. IV.—Indian Marine Surveys. *Col. H. Yule, C. B.*—Visits of Mr. F. Paderin to the site of Karakorum. The Kashgar Mission. *Baron Ferdinand Von Richthofen.*—Land Communication between Europe and China. *Col. H. Yule, C. B.*—The Atlas Sinensis and other Sinensiana.

No. VI.—*Capt. J. E. Davis*—The Voyage of the 'Challenger,' IV. A Contribution to Cyclone History.

No. VII.—*Lieut. Gill, R. E.*—Travels in Northern Persia. *Capt. J. E. Davis*—The Voyage of the 'Challenger.' *V. E. G. Ravenstein*—Formosa.

THE EDITOR.

Journal Asiatique. Vol. III, No. 4.

ASIATIC SOCIETY OF PARIS.

Cours de Géologie Comparée, par Stanislas Meunier.

THE AUTHOR.

Inhaltsverzeichniss der Abhandlungen der Königlichen Akademie der Wissenschaften zu Berlin aus den Jahren 1822 bis 1872.

Monatsbericht, August, 1874.

THE ROYAL BERLIN ACADEMY.

Ueber das Wesen und den Werth des Wedischen Accents. Von Martin Haug.

THE AUTHOR.

Mittheilungen der Schweizerischen Entomologischen Gesellschaft. Bulletin de la Société Entomologique Suisse.

ENTOMOLOGICAL SOCIETY OF SWITZERLAND.

Mittheilungen der Deutschen Gesellschaft für Natur und Völkerkunde Ostasien's, No. 5, July, 1874.

THE GERMAN JAPAN SOCIETY OF EASTERN ASIA.

Transactions of the Asiatic Society of Japan, from 22nd October, 1873, to 15th July, 1874.

*Capt. A. R. Brown.*—Winds and Currents in the vicinity of the Japanese Islands. *W. G. Aston.*—Has Japanese an affinity with Aryan languages?

ASIATIC SOCIETY OF JAPAN.

Professional Papers on Indian Engineering. Edited by Major A. M. Lang, R. E.

The Rigi Railway on the Ladder System. Cantwell's Lock Tiles. Notes on the Multán Inundation Canals. Molesworth's Ratchet Dredger. Proposed Grating for



stopping Floating Logs near head of Ganges Canal. On the Construction of Oblique Arches. Masonry Dams for Reservoirs. Concrete Blocks for Manora Break-water. Pitt's Proposed Dredgers. Hollow Walls of Brick-work. On Angle-iron Flanges.

THE EDITOR.

The Flora Sylvatica for Southern India. By Major R. H. Beddome. Parts I and II.

THE GOVERNMENT OF MADRAS.

Report on the Administration of the Central Provinces, for the year 1873-74.

Report on the Trade and Resources of the Central Provinces, for the year 1873-74.

THE CHIEF COMMISSIONER, CENTRAL PROVINCES.

Minutes of the Trustees of the Indian Museum. April, 1873, to March 1874.

THE TRUSTEES OF THE INDIAN MUSEUM.

Scientific Lectures in Hindi. Meteorology, No. II. By Lakshmi Sankar Misra, M. A., Professor of Mathematics, Benares College.

THE AUTHOR.

#### *Purchase.*

Journal of the Society of Arts. Vol. XXII, No. 1126 to 1137.

The London, Edinburgh, and Dublin Philosophical Magazine, and Journal of Science. Vol. 48, No. 317.

Baron N. Schilling—The Constant Currents in the Air and in the Sea: an Attempt to refer them to a common Cause. Alfred Tylor—On Tides and Waves. Deflection Theory.

The Annals and Magazine of Natural History. Vol. 14, No. 81.

Rev. O. P. Cambridge—On some new Genera and Species of *Araneidea*. A. G. Butler—Descriptions of four new species of *Glomeridæ* from Sikkim. J. Wood-Mason—On a new Genus and Species (*Hyleocarcinus Humei*) of Land-Crabs from the Nicobar Islands. G. J. Allman—On a new Order of Hydrozoa. S. I. Smith—On Tube-building *Amphipoda*.

Conchologia Iconica: Pt. containing genera.—*Solen. Cultellus. Solecurtus. Pharus. Megaspira. Margarita. Emarginula. Chilina. Trichotropis*, by Lovell Reeve, F. L. S., F. G. S.

The American Journal of Science and Arts, Vol. VIII, No. 44, for August, 1874.

A. M. Mayer.—Researches in Acoustics. O. N. Rood. On an optical method of studying the Vibrations of Solid Bodies. C. A. Morey. The Phonautograph.

Revue des Deux Mondes, Vol. XLIV, for 15th August and 1st September, 1874.

Comptes Rendus, Vol. LXXIX, No. 5 to 8.



No. 5. *M. Th. du Moncel*.—Sur la conductibilité électrique des corps ligneux.  
*MM. V. Feltz et E. Ritter*.—De l'action du chloral sur le sang.

No. 6. *M. Th. du Moncel*.—5me note sur la conductibilité des corps ligneux.  
*MM. A. Muntz et Ramspacher*.—Dosage du Tannin. *MM. L. Fautrat et A. Sartiaux*.—  
De l'influence des forêts sur la quantité de pluie que reçoit une contrée.

Bulletins de la Société D'Anthropologie de Paris. Vol. IX, Fasc. I.  
Jan. Fev., 1874.

*Exchange.*

Athenæum, for August, 1874.

Nature, from Nos. 257 to 262.



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## ERRATA.

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- Page 72, line 22, *for* uncle *read* father.
- Page 100, note, *for* Carlyle *read* Carlleyle.
- Page 106, note, Add—"Túyah is the name of an Afghán tribe."
- Page 160, line 16, *for* کو *read* کو
- Page 162, line 33, *for* دني *read* دني
- Page 163, line 6, substitute 'The pole of the period has left the lower world.'
- Page 163, line 16, Add—' In this *tárikh* we have to *read* شيخ
- Page 168, line 2, dele ابن
- Page 168, second foot note, Add—' Mr. Beale translates *Mugaddasi* by 'an inhabitant of Jerusalem.'
- Page 173, third foot note, Add—'The literal translation is—"The Ráná became a Rání [*i. e.*, a woman] from the terror of his sword."
- Page 179, line 27, *for* العتيق *read* العتيق
- Page 180, line 3, substitute, "Like the old house [the Ka'bah]."  
A. H. 1074.
- Page 210, line 27, *for* it *read* it is.
-







*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1873.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahrt.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	30.002	30.073	29.925	0.148	73.1	81.5	66.8	14.7
2	29.990	.056	.930	.126	74.4	82.7	66.5	16.2
3	30.013	.076	.957	.119	73.9	78.6	70.4	8.2
4	29.996	.071	.931	.140	72.8	80.4	67.5	12.9
5	.990	.049	.950	.099	71.9	80.5	63.1	17.4
6	30.019	.092	.978	.114	71.8	80.0	64.8	15.2
7	.024	.098	.965	.133	72.8	80.6	66.5	14.1
8	.036	.120	.979	.141	71.0	77.2	66.8	10.4
9	.032	.103	.968	.135	71.8	81.5	64.6	16.9
10	.051	.131	.991	.140	72.7	82.5	64.5	18.0
11	.062	.110	30.017	.093	72.3	78.0	69.0	9.0
12	.093	.160	.034	.126	73.8	80.0	70.0	10.0
13	.089	.177	.025	.152	69.9	77.8	63.0	14.8
14	.044	.122	29.974	.148	68.4	77.0	61.9	15.1
15	.066	.130	30.019	.111	68.7	78.5	61.0	17.5
16	.107	.180	.058	.122	69.7	78.4	62.5	15.9
17	.119	.197	.060	.137	69.6	78.0	61.5	16.5
18	.059	.146	29.980	.166	69.6	78.4	62.5	15.9
19	.000	.086	.944	.142	69.3	78.5	61.6	16.9
20	29.996	.079	.938	.141	69.4	78.3	62.2	16.1
21	30.055	.137	30.001	.136	69.1	78.5	61.0	17.5
22	.072	.140	.023	.117	67.5	76.5	59.0	17.5
23	.051	.139	29.989	.150	68.0	77.5	60.9	16.6
24	29.996	.066	.933	.133	67.8	78.0	60.0	18.0
25	30.004	.080	.955	.125	66.9	77.8	57.5	20.3
26	.009	.086	.958	.128	67.6	78.3	58.0	20.3
27	29.966	.064	.897	.167	68.1	79.6	58.5	21.1
28	.911	29.985	.862	.123	69.8	80.0	61.5	18.5
29	.951	30.013	.898	.115	67.3	74.0	61.2	12.8
30	30.004	.087	.946	.141	63.9	71.5	57.8	13.7
31	.015	.095	.954	.141	63.4	73.3	55.5	17.8

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1873.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	68.2	4.9	64.3	8.8	0.603	6.60	2.19	0.75
2	69.7	4.7	66.4	8.0	.646	7.06	.09	.77
3	67.4	6.5	62.8	11.1	.574	6.27	.74	.70
4	64.5	8.3	57.9	14.9	.488	5.33	3.38	.61
5	63.1	8.8	56.1	15.8	.450	.63	.45	.59
6	63.6	8.2	57.0	14.8	.473	.18	.27	.61
7	64.6	8.2	58.0	14.8	.489	.34	.37	.61
8	63.1	7.9	56.8	14.2	.470	.16	.09	.63
9	64.5	7.3	58.7	13.1	.501	.94	2.96	.65
10	67.5	5.2	63.3	9.4	.584	6.39	.29	.74
11	69.8	2.5	67.8	4.5	.677	7.41	1.17	.86
12	68.3	5.5	64.4	9.4	.605	6.62	2.36	.74
13	63.3	6.6	58.0	11.9	.489	5.38	.60	.67
14	61.2	7.2	55.4	13.0	.449	4.95	.67	.65
15	62.3	6.4	57.2	11.5	.476	5.24	.45	.68
16	62.6	7.1	56.9	12.8	.472	.18	.75	.65
17	63.5	6.1	58.6	11.0	.499	.50	.40	.70
18	63.8	5.8	59.2	10.4	.509	.62	.28	.71
19	63.8	5.5	59.4	9.9	.513	.64	.19	.72
20	63.4	6.0	58.6	10.8	.499	.50	.36	.70
21	61.9	7.2	56.1	13.0	.459	.06	.72	.65
22	60.2	7.3	54.4	13.1	.434	4.79	.63	.65
23	61.3	6.7	55.9	12.1	.456	5.04	.49	.67
24	61.2	6.6	55.9	11.9	.456	.04	.44	.67
25	60.2	6.7	54.8	12.1	.440	4.86	.42	.67
26	61.4	3.2	56.4	11.2	.464	5.12	.32	.69
27	62.9	5.2	58.7	9.4	.501	.54	.01	.73
28	64.4	5.4	60.1	9.7	.525	.77	.18	.73
29	62.5	4.8	58.7	8.6	.501	.54	1.83	.75
30	58.2	5.7	53.1	10.8	.415	4.63	2.00	.70
31	58.2	5.2	53.5	9.9	.421	.69	1.84	.72

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1878.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Falt.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	30.032	30.123	29.916	0.207	66.7	73.4	60.0	13.4
1	.023	.113	.906	.207	66.1	73.2	58.8	14.4
2	.014	.107	.901	.206	65.4	72.7	58.0	14.7
3	.001	.101	.893	.208	64.8	72.0	57.5	14.5
4	.002	.115	.895	.220	64.2	71.8	57.0	14.8
5	.014	.125	.910	.215	63.7	71.0	56.0	15.0
6	.030	.138	.923	.215	63.2	70.8	55.5	15.3
7	.050	.148	.936	.212	62.9	70.4	55.5	14.9
8	.074	.172	.963	.209	64.6	71.0	56.5	14.5
9	.098	.197	.985	.212	68.4	73.5	61.2	12.3
10	.100	.195	.964	.231	71.8	77.5	64.3	13.2
11	.081	.175	.946	.229	64.6	80.5	66.3	14.2
Noon.	.050	.138	.921	.217	76.3	81.2	68.3	12.9
1	.017	.106	.906	.200	77.5	82.5	70.0	12.5
2	29.990	.079	.892	.187	78.1	82.7	70.3	12.4
3	.976	.065	.862	.203	78.3	82.5	71.5	11.0
4	.970	.060	.862	.198	76.9	81.3	70.0	11.3
5	.976	.071	.863	.208	75.4	79.5	69.0	10.5
6	.990	.077	.874	.203	73.0	78.0	66.4	11.6
7	30.006	.098	.886	.212	71.3	76.7	65.0	11.7
8	.022	.119	.902	.217	70.0	76.0	63.5	12.5
9	.036	.136	.916	.220	68.8	75.5	62.5	13.0
10	.043	.129	.925	.204	67.8	74.5	61.5	13.0
11	.038	.131	.920	.211	67.1	74.0	60.5	13.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1873.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid. night.	63.0	3.7	60.0	6.7	0.523	5.79	1.44	0.80
1	62.4	3.7	59.4	6.7	.513	.68	.42	.80
2	61.8	3.6	58.9	6.5	.504	.59	.36	.80
3	61.3	3.5	58.5	6.3	.498	.53	.30	.81
4	60.8	3.4	57.7	6.5	.485	.38	.31	.80
5	60.3	3.4	57.2	6.5	.476	.29	.30	.80
6	60.0	3.2	57.1	6.1	.475	.30	.19	.82
7	59.7	3.2	56.8	6.1	.470	.25	.18	.82
8	60.6	4.0	57.4	7.2	.480	.33	.45	.79
9	62.2	6.2	57.2	11.2	.476	.25	2.37	.69
10	63.8	8.0	57.4	14.4	.480	.26	3.19	.62
11	65.3	9.3	58.8	15.8	.503	.47	.73	.60
Noon.	65.8	10.5	58.4	17.9	.496	.38	4.31	.56
1	66.2	11.3	58.3	19.2	.494	.35	.69	.53
2	66.3	11.8	58.0	20.1	.489	.29	.93	.52
3	66.4	11.9	58.1	20.2	.491	.31	.97	.52
4	66.0	10.9	58.4	18.5	.496	.37	.49	.56
5	66.0	9.4	59.4	16.0	.513	.58	3.85	.59
6	66.2	6.8	60.8	12.2	.537	.88	2.88	.67
7	65.5	5.8	60.9	10.4	.539	.92	.41	.71
8	65.0	5.0	61.0	9.0	.541	.95	.05	.74
9	64.3	4.5	60.7	8.1	.536	.90	1.81	.77
10	63.6	4.2	60.2	7.6	.527	.82	.66	.78
11	63.2	3.9	60.1	7.0	.525	.81	.51	.79

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1873.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<sup>o</sup>	Inches		lb	Miles.	
1	125.0	...	E N E	...	44.2	\\i & \\i to 3 P. M. B to 11 P. M. Slightly foggy at 6 & 7 A. M.
2	132.8	...	E by N & E N E	...	97.9	B to 6 A. M., \\i to 11 A. M., \\i to 4 P. M., \\i to 11 P. M.
3	102.0	...	E N E & N E	...	151.6	\\i to 2 A. M. O to 11 P. M. D at 3 P. M.
4	123.0	...	N E & N	0.5	174.6	\\i to 9 A. M., \\i to 7 P. M., \\i to 11 P. M.
5	130.0	...	N E & N	...	168.2	\\i & \\i
6	124.2	...	N N E & N E	...	175.3	\\i
7	129.0	...	N \\i E	...	127.0	\\i to 10 A. M., \\i to 11 P. M.
8	127.7	...	N E & E N E	...	98.6	\\i to 3 A. M. O to 5 A. M., \\i to 10 A. M., \\i to 3 P. M., \\i to 5 P. M. B to 11 P. M.
9	132.5	...	E N E	...	65.6	B to 3 A. M., \\i to 7 A. M. B to 11 A. M. \\i to 6 P. M. B to 11 P. M. Slightly foggy from 7 to 9 P. M.
10	132.0	...	E by N, E, & S	...	75.8	B to 8 A. M., \\i to 2 P. M. \\i to 4 P. M. B to 11 P. M.
11	118.5	0.82	S, E S E & E N E	...	96.2	S to 5 A. M. O to 11 P. M. R from 9½ to 11 A. M. & at 4½, 8, & 9 P. M.
12	126.0	...	E N E	...	107.5	O to 1 A. M., \\i to 8 A. M. B to 11 P. M.
13	130.0	...	E N E & N by W	...	121.2	B.
14	130.0	...	N N W & N by W	...	126.0	B.
15	129.0	...	N N W & E N E	...	121.9	B to 4 P. M., \\i to 6 P. M., B to 11 P. M.
16	131.5	...	E N E	...	113.7	B to 6 A. M., \\i to 5 P. M. B to 11 P. M.
17	131.5	...	E N E	...	84.2	B to 5 A. M., \\i to 10 A. M. B to 4 P. M., \\i to 9 P. M. B to 11 P. M. Slightly foggy at 5 & 6 A. M. & 9 & 10 P. M.
18	130.0	...	E N E	...	73.4	B to 6 A. M. \\i to 6 P. M. B to 11 P. M. Slightly foggy at 10 & 11 P. M.

\\i Cirri, —i Strati, \\i Cumuli, \\i Cirro-strati, ~i Cumulo-strati, \\i Nimbi, \\i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning, R rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1873.*

**Solar Radiation, Weather, &c.**

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Mile.	
19	130.5	...	E N E	...	77.9	B to 11 A. M., $\searrow$ i to 1 P. M. B to 11 P. M. Slightly foggy from 9 to 11 P. M.
20	133.4	...	E N E & N E	...	62.5	B to 11 A. M., $\searrow$ i to 3 P. M. B to 11 P. M.
21	132.5	...	N E	0.4	116.8	B to 12 A. M., $\searrow$ i to 2 P. M. B to 11 P. M. Slightly foggy at 6 & 7 A. M.
22	127.0	...	N E & N N W	...	42.7	B.
23	128.0	...	N & N E	...	199.9	B to 12 A. M., $\searrow$ i to 3 P. M. B to 11 P. M.
24	131.7	...	N E	...	149.1	B.
25	130.0	...	N E & E	...	81.5	B. Slightly foggy from at 7 & 8 A. M.
26	133.7	...	E	...	56.5	B. Slightly foggy from 6 to 8 A. M. & 7 to 11 P. M.
27	129.0	...	E & S W	...	47.1	B. Slightly foggy from 5 to 7 A. M.
28	136.0	...	S W & S S W	...	117.5	B to 1 P. M., $\searrow$ i to 4 P. M. B to 8 P. M., $\searrow$ i to 11 P. M.
29	125.5	...	S S W, N N W & N	...	138.7	$\searrow$ i to 6 A. M. B to 12 A. M. $\searrow$ i to 5 P. M. B to 11 P. M.
30	128.0	...	N N E & N by W	...	143.7	B. Slightly foggy from 9 to 11 P. M.
31	127.0	...	N by W & W N W	...	89.3	B. Slightly foggy at midnight & 1 from 6 to 10 A. M. & 8 to 11 P. M.

$\searrow$  i Cirri,  $\searrow$  i Strati,  $\searrow$  i Cumuli,  $\searrow$  i Cirro-strati,  $\searrow$  i Cumulo-strati,  $\searrow$  i Nimbi,  $\searrow$  i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning  
R. rain, D drizzle.



# Meteorological Observations.

c

## Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of December 1873.

### MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month ... ..	30.027
Max. height of the Barometer occurred at 9 A. M. on the 17th ...	30.197
Min. height of the Barometer occurred at 3 & 4 P. M. on the 28th ...	29.862
Extreme range of the Barometer during the month ... ..	0.335
Mean of the daily Max. Pressures ... ..	30.102
Ditto ditto Min. ditto ... ..	29.969
Mean daily range of the Barometer during the month ... ..	0.133

	°
Mean Dry Bulb Thermometer for the month ... ..	69.9
Max. Temperature occurred at 2 P. M. on the 2nd ... ..	82.7
Min. Temperature occurred at 6 & 7 A. M. on the 31st ... ..	55.5
Extreme range of the Temperature during the month ... ..	27.2
Mean of the daily Max. Temperature ... ..	78.5
Ditto ditto Min. ditto, ... ..	62.8
Mean daily range of the Temperature during the month ... ..	15.7

Mean Wet Bulb Thermometer for the month ... ..	63.6
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	6.3
Computed Mean Dew-point for the month ... ..	58.6
Mean Dry Bulb Thermometer above computed mean Dew-point ...	11.3

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.499

	Troy grain.
Mean Weight of Vapour for the month ... ..	5.50
Additional Weight of Vapour required for complete saturation ...	2.48
Mean degree of humidity for the month, complete saturation being unity	0.69

	°
Mean Max. Solar radiation Thermometer for the month ... ..	128.3

	Inches.
Rained 2 days,—Max. fall of rain during 24 hours ... ..	0.82
Total amount of rain during the month ... ..	0.82
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	0.73
Prevailing direction of the Wind ... .. E. N. E. & N E.	

\* Height 70 feet 10 inches above ground.



### MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1874.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	30.012	30.096	29.956	0.140	64.9	75.4	56.5	18.9
2	29.993	.068	.930	.138	67.1	77.8	57.3	20.5
3	30.002	.066	.946	.120	69.9	79.5	63.6	15.9
4	.093	.166	30.025	.141	68.2	76.8	62.2	14.6
5	.121	.197	.059	.138	64.5	73.6	56.0	17.6
6	.092	.160	.035	.125	61.9	71.8	53.6	18.2
7	.100	.191	.037	.154	61.0	72.0	52.5	19.5
8	.110	.199	.067	.132	61.7	74.0	51.8	22.2
9	.080	.178	.004	.174	62.3	74.8	51.4	23.4
10	.060	.159	.004	.155	65.3	78.5	54.0	24.5
11	.019	.110	29.947	.163	69.0	81.0	59.5	21.5
12	29.957	.036	.905	.131	71.9	84.5	62.7	21.8
13	.932	29.999	.869	.130	68.2	75.0	62.5	12.5
14	30.013	30.086	.945	.141	61.4	70.0	53.6	16.4
15	.050	.137	30.003	.134	61.0	72.5	51.5	21.0
16	.056	.121	.008	.113	63.3	75.0	53.4	21.6
17	.100	.171	.052	.119	65.9	76.6	57.0	19.6
18	.156	.229	.088	.141	65.2	76.0	54.5	21.5
19	.161	.249	.094	.155	63.6	75.0	55.0	20.0
20	.114	.177	.047	.130	64.6	75.7	56.0	19.7
21	.101	.181	.034	.147	67.4	78.5	57.7	20.8
22	.045	.129	29.967	.162	69.9	80.0	61.0	19.0
23	.005	.077	.946	.131	72.5	82.5	65.5	17.0
24	29.977	.055	.906	.149	72.3	82.1	66.0	16.1
25	30.001	.079	.931	.148	63.6	68.0	60.2	7.8
26	.062	.140	30.005	.135	64.8	74.0	58.3	15.7
27	.101	.167	.048	.119	65.4	74.2	56.5	17.7
28	.062	.140	29.974	.166	66.9	76.3	58.0	18.3
29	29.994	.061	.931	.130	69.7	78.5	61.0	17.5
30	.928	29.991	.836	.155	71.8	80.6	65.8	14.8
31	.959	30.029	.876	.153	73.1	81.0	66.6	14.4

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	59.2	5.7	54.6	10.3	0.437	4.86	1.99	0.71
2	62.6	4.5	59.0	8.1	.506	5.60	.72	.77
3	65.4	4.5	61.8	8.1	.555	6.11	.87	.77
4	61.1	7.1	55.4	12.8	.449	4.95	2.63	.65
5	57.0	7.5	51.0	13.5	.386	.30	.46	.64
6	54.2	7.7	47.3	14.6	.340	3.80	.43	.61
7	53.7	7.3	47.1	13.9	.338	.78	.28	.62
8	54.5	7.2	48.0	13.7	.349	.90	.29	.63
9	55.7	6.6	49.8	12.5	.371	4.14	.17	.66
10	58.4	6.9	52.9	12.4	.412	.59	.34	.66
11	63.2	5.8	58.6	10.4	.499	5.51	.25	.71
12	66.1	5.8	61.5	10.4	.550	6.04	.44	.71
13	60.9	7.3	55.1	13.1	.444	4.91	.67	.65
14	52.4	9.0	44.3	17.1	.307	3.44	.70	.56
15	53.6	7.4	46.9	14.1	.336	.76	.30	.62
16	57.1	6.2	51.5	11.8	.393	4.38	.13	.67
17	60.2	5.7	55.6	10.3	.452	5.02	.04	.71
18	57.4	7.8	51.2	14.0	.389	4.33	.58	.63
19	56.2	7.4	49.5	14.1	.367	.09	.48	.62
20	58.3	6.3	53.3	11.3	.418	.66	.12	.69
21	62.5	4.9	58.6	8.8	.449	5.52	1.87	.75
22	64.6	5.3	60.4	9.5	.530	.83	2.15	.73
23	68.7	3.8	65.7	6.8	.632	6.92	1.71	.80
24	68.7	3.6	65.8	6.5	.634	.94	.64	.81
25	61.7	1.9	60.0	3.6	.523	5.82	0.75	.89
26	61.4	3.4	58.7	6.1	.501	.57	1.26	.82
27	61.1	4.3	57.7	7.7	.485	.37	.58	.77
28	61.8	5.1	57.7	9.2	.485	.36	.92	.74
29	65.0	4.7	61.2	8.5	.544	.99	.94	.76
30	69.0	2.8	66.8	5.0	.655	7.19	.26	.85
31	70.7	2.4	68.8	4.3	.699	.65	.14	.87

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	30.053	30.196	29.925	0.271	62.5	70.5	55.5	15.0
1	.043	.180	.907	.273	61.8	70.0	54.8	15.2
2	.034	.162	.894	.268	61.1	69.5	54.2	15.3
3	.024	.148	.878	.270	60.5	68.8	53.3	15.5
4	.017	.138	.869	.269	59.9	68.2	52.7	15.5
5	.028	.149	.882	.267	59.3	67.7	52.0	15.7
6	.042	.169	.897	.272	58.7	67.5	51.5	16.0
7	.061	.184	.916	.268	58.4	66.6	51.4	15.2
8	.088	.215	.962	.253	59.9	68.3	53.0	15.3
9	.115	.241	.983	.258	61.4	72.0	58.0	14.0
10	.122	.249	.991	.258	68.3	75.6	63.0	12.6
11	.105	.223	.974	.249	71.3	77.0	64.3	12.7
Noon.	.077	.193	.945	.248	73.4	79.6	63.8	15.8
1	.043	.158	.911	.247	74.6	82.7	63.0	19.7
2	.018	.130	.882	.248	75.7	83.6	62.2	21.4
3	.000	.104	.854	.250	76.2	84.5	61.8	22.7
4	29.990	.095	.836	.259	74.8	83.0	61.0	22.0
5	.995	.094	.876	.218	73.1	81.2	61.0	20.2
6	30.009	.116	.890	.226	70.4	76.6	61.5	15.1
7	.026	.141	.903	.238	68.4	74.6	61.2	13.4
8	.045	.168	.920	.248	66.9	74.0	60.5	13.5
9	.060	.196	.939	.257	65.7	73.5	58.7	14.8
10	.067	.209	.937	.272	64.6	72.0	57.3	14.7
11	.062	.200	.939	.261	63.5	71.0	56.8	14.2

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	59.3	3.2	56.4	6.1	0.464	5.18	1.17	0.82
1	58.8	3.0	56.1	5.7	.459	.14	.07	.83
2	58.2	2.9	55.6	5.5	.452	.06	.02	.83
3	57.7	2.8	55.2	5.3	.445	.00	0.97	.84
4	57.3	2.6	55.0	4.9	.442	4.97	.88	.85
5	56.9	2.4	54.7	4.6	.438	.92	.82	.86
6	56.4	2.3	54.3	4.4	.432	.87	.77	.86
7	56.1	2.3	54.0	4.4	.428	.82	.76	.86
8	57.1	2.8	54.6	5.3	.437	.91	.94	.84
9	59.9	4.5	55.8	8.6	.455	5.06	1.68	.75
10	61.9	6.4	56.8	11.5	.470	.18	2.42	.68
11	63.0	8.3	56.4	14.9	.464	.08	3.25	.61
Noon.	63.6	9.8	55.8	17.6	.455	4.96	.91	.56
1	63.8	10.8	56.2	18.4	.461	5.02	4.18	.55
2	64.4	11.3	56.5	19.2	.465	.06	.45	.53
3	64.4	11.8	56.1	20.1	.459	4.99	.67	.52
4	63.5	11.3	55.6	19.2	.452	.93	.33	.53
5	63.6	9.5	56.0	17.1	.458	5.00	3.79	.57
6	63.8	6.6	58.5	11.9	.498	.47	2.63	.68
7	63.1	5.3	58.9	9.5	.504	.56	.06	.73
8	62.2	4.7	58.4	8.5	.496	.48	1.80	.75
9	61.5	4.2	58.1	7.6	.491	.44	.58	.78
10	60.8	3.8	57.8	6.8	.486	.40	.38	.80
11	60.1	3.4	57.0	6.5	.473	.27	.28	.81

All the Hygrometrical elements are computed by the Greenwich Constants.



*Meteorological Observations.*

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*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches		lb	Miles.	
1	130.0	...	W N W & N E	...	70.2	B. Foggy from midnight to 7 A. M. & 7 to 11 P. M.
2	135.5	...	S S E & S by W	...	50.8	B to 11 A. M., \i to 4 P. M. B to 11 P. M. Foggy from 2 to 8 A. M.
3	131.2	...	S by W & N by E	...	106.7	B to 4 A. M., \i to 8 A. M., \i to 1 P. M. B to 8 P. M., \i to 11 P. M.
4	127.8	...	E N E & N N E	...	146.1	\i to 4 A. M. B to 11 P. M. Slightly foggy at 11 P. M.
5	127.0	...	N N E & N by W	...	143.4	B Slightly foggy at 6 A. M. & from 8 to 10 P. M.
6	130.6	...	N by E & N N W	...	140.1	B to 1 P. M., \i to 6 P. M. B to 11 P. M.
7	127.6	...	N by E & N W	...	145.7	B to 2 P. M., \i to 4 P. M. B to 11 P. M.
8	128.8	...	N W & N E	...	138.1	B to 4 P. M., \i to 8 P. M. B to 11 P. M. Slightly foggy from 7 to 11 P. M.
9	129.0	...	N E	...	99.4	B. Slightly foggy from 5 to 7 A. M. & 9 to 11 P. M.
10	129.0	...	N E	...	63.8	B Foggy from midnight to 8 A. M. & at 7 & 8 P. M.
11	132.0	...	S & N W	...	99.9	B to 11 A. M., \i to 5 P. M. B to 11 P. M. Slightly foggy from 6 to 8 A. M.
12	135.0	...	S S W	...	86.5	B to 3 P. M., \i to 8 P. M. B to 11 P. M. Foggy from 2 to 8 A. M.
13	124.0	...	S S W & N W	1.0	174.7	B.
14	126.0	...	N N E & N W	0.4	170.9	B. Slightly foggy from 7 to 11 P. M.
15	130.0	...	W S W & N W	...	88.7	B. Slightly foggy from 8 to 11 P. M.
16	129.8	...	W by S & W by N	...	80.7	B. Slightly foggy at 6 & 7 A. M.
17	135.0	...	S S W & W	...	89.9	B to 11 A. M., \i to 5 P. M. B to 11 P. M.
18	133.0	...	NNW, N & ENE	...	118.8	B to 7 A. M., \i to 12 A. M. B to 11 P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning, R rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Mile.	
19	126.0	...	E N E & W N W	...	92.3	B to 5 A. M., \i to 7 A. M. B to 11 P. M. Slightly foggy at 11 P. M.
20	121.0	...	W N W & W by S	...	114.8	Chiefly B Slightly foggy at midnight 1 A. M. & 11 P. M.
21	131.0	...	W by S, N & N W	...	74.7	B to 11 A. M., \i to 6 P. M., B to 11 P. M. Slightly foggy at midnight 1 from 6 to 8 A. M. & 7 to 11 P. M.
22	133.0	...	S W & W N W	...	76.4	B to 7 A. M., \i to 11 A. M., \i to 5 P. M. B to 11 P. M. Foggy at midnight & from 5 to 10 A. M.
23	135.6	...	S W	...	109.1	B to 6 A. M., \i to 9 A. M. \i to 4 P. M., \i to 11 P. M. Foggy from 2 to 9 A. M.
24	134.2	...	S W & S S W	...	149.3	B to 8 A. M., \i to 4 P. M. B to 11 P. M. Slightly foggy from 5 to 8 A. M.
25		0.49	SS W, N & E by N	1.0	189.0	B to 1 A. M., \i to 4 A. M. O to 4 P. M., \i to 11 P. M. Slight R from 10 A. M. to 4 P. M.
26	135.0	...	E by N & Variable	...	96.3	B to 9 A. M., \i to 12 A. M., \i to 7 P. M. B to 9 P. M., \i to 11 P. M.
27	129.0	...	E N E & N E	...	84.5	\i to 1 A. M. B to 7 A. M., \i to 11 P. M. Foggy at 6 & 7 A. M. & from 7 to 10 P. M.
28	125.5	...	[N W N E, E N E & W	...	92.6	B to 3 P. M., \i to 6 P. M. B to 11 P. M. Foggy at 8 & 9 P. M.
29	134.8	...	S W & Variable	...	64.9	B to 9 A. M., \i to 2 P. M., \i to 11 P. M. Slightly foggy from 6 to 8 A. M.
30	132.0	0.22	S S W & S W	2.4	119.4	\i & \i to 5 A. M. O to 9 A. M., \i to 4 P. M. O to 11 P. M. L on S at 10 P. M. T & R at 5 P. M.
31	125.0	0.23	S W & W S W	...	115.3	Scuds to 2 A. M. O to 11 A. M., \i to 3 P. M. O to 11 P. M. T, L & Slight R from 5½ to 10½ P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,  
\i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning  
R. rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1874.*

MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	30.047
Max. height of the Barometer occurred at 10 A. M. on the 19th ...	30.249
Min. height of the Barometer occurred at 4 P. M. on the 30th ...	29.836
Extreme range of the Barometer during the month ... ..	0.413
Mean of the daily Max. Pressures ... ..	30.124
Ditto ditto Min. ditto ... ..	29.983
Mean daily range of the Barometer during the month ... ..	0.141

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	°
Mean Dry Bulb Thermometer for the month ... ..	66.4
Max. Temperature occurred at 3 P. M. on the 12th... ..	84.5
Min. Temperature occurred at 7 A. M. on the 9th ... ..	51.4
Extreme range of the Temperature during the month ... ..	33.1
Mean of the daily Max. Temperature ... ..	76.5
Ditto ditto Min. ditto, ... ..	58.1
Mean daily range of the Temperature during the month ... ..	18.4

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Mean Wet Bulb Thermometer for the month ... ..	60.7
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	5.7
Computed Mean Dew-point for the month ... ..	56.1
Mean Dry Bulb Thermometer above computed mean Dew-point ... ..	10.3

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.459

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	Troy grain.
Mean Weight of Vapour for the month ... ..	5.10
Additional Weight of Vapour required for complete saturation ...	2.07
Mean degree of humidity for the month, complete saturation being unity	0.71

	°
Mean Max. Solar radiation Thermometer for the month ... ..	130.1

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	Inches.
Rained 3 days,—Max. fall of rain during 24 hours ... ..	0.49
Total amount of rain during the month ... ..	0.94
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	0.82
Prevailing direction of the Wind ... .. N. E. & S. W.	

Height 70 feet 10 inches above ground.



Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1874.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahit.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	30.049	30.117	29.965	0.152	68.2	72.0	64.5	7.5
2	.052	.141	.984	.157	70.0	76.5	64.5	12.0
3	.037	.105	.978	.127	71.0	77.2	67.0	10.2
4	.037	.130	.961	.169	70.5	78.4	62.2	16.2
5	.000	.094	.920	.174	67.4	72.0	63.7	8.3
6	29.945	.015	.896	.119	64.8	69.0	61.5	7.5
7	.932	.011	.887	.124	66.1	72.3	62.8	9.5
8	.973	.055	.926	.129	66.4	75.5	58.5	17.0
9	.880	29.965	.790	.175	68.2	78.5	58.3	20.2
10	.765	.834	.703	.131	73.4	83.7	65.4	18.3
11	.785	.845	.743	.102	76.5	82.0	73.0	9.0
12	.844	.910	.783	.127	77.3	83.2	73.2	10.0
13	.915	.996	.868	.128	71.1	75.4	67.5	7.9
14	.924	30.016	.830	.186	71.2	77.7	67.0	10.7
15	30.058	.145	.986	.159	66.3	74.6	58.6	16.0
16	.103	.182	30.055	.127	66.7	77.0	57.0	20.0
17	.092	.174	.028	.146	68.8	79.7	58.5	21.2
18	29.988	.074	29.910	.164	71.1	83.2	61.3	21.9
19	.961	.037	.916	.121	74.6	84.4	67.3	17.1
20	.962	.052	.907	.145	75.5	84.7	69.2	15.5
21	.907	29.977	.847	.130	78.0	86.2	71.8	14.4
22	.886	.959	.837	.122	78.2	89.3	70.8	18.5
23	.938	30.029	.871	.158	76.5	83.5	70.5	13.0
24	.928	.003	.864	.139	75.0	82.5	70.3	12.2
25	.904	29.989	.849	.140	77.2	87.2	70.5	16.7
26	.926	30.019	.863	.156	77.4	86.6	69.2	17.4
27	.949	.015	.882	.133	77.4	84.7	72.5	12.2
28	.991	.079	.938	.141	75.9	85.7	69.0	16.7

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	65.6	2.6	63.5	4.7	0.588	6.48	1.10	0.86
2	66.9	3.1	64.4	5.6	.605	.66	.34	.83
3	67.3	3.7	64.3	6.7	.603	.63	.62	.80
4	65.1	5.4	60.8	9.7	.537	5.90	2.23	.73
5	65.5	1.9	64.0	3.4	.597	6.61	0.78	.89
6	63.1	1.7	61.7	3.1	.554	.15	.68	.90
7	61.9	4.2	58.5	7.6	.498	5.51	1.59	.78
8	60.7	5.7	56.1	10.3	.459	.10	2.07	.71
9	62.8	5.4	58.5	9.7	.498	.49	.09	.72
10	70.5	2.9	68.2	5.2	.686	7.50	1.37	.85
11	73.7	2.8	71.7	4.8	.768	8.35	.40	.86
12	73.1	4.2	70.2	7.1	.732	7.94	2.04	.80
13	65.2	5.9	60.5	10.6	.532	5.84	.44	.71
14	66.6	4.6	62.9	8.3	.576	6.33	1.97	.76
15	57.3	9.0	50.1	16.2	.375	4.15	3.00	.58
16	58.9	7.8	52.7	14.0	.409	.54	2.69	.63
17	61.0	7.8	54.8	14.0	.440	.84	.87	.63
18	65.4	5.7	60.8	10.3	.537	5.90	.38	.71
19	69.9	4.7	66.6	8.0	.651	7.09	.11	.77
20	70.7	4.8	67.3	8.2	.666	.25	.21	.77
21	73.3	4.7	70.0	8.0	.727	.87	.32	.77
22	72.4	5.8	68.3	9.9	.688	.45	.80	.73
23	70.7	5.8	66.6	9.9	.651	.07	.68	.73
24	68.6	6.4	64.1	10.9	.599	6.52	.79	.70
25	69.4	7.8	63.9	13.3	.595	.46	3.49	.65
26	69.9	7.5	64.6	12.8	.609	.60	.41	.66
27	72.4	5.0	68.9	8.5	.701	7.60	2.41	.76
28	66.9	9.0	60.6	15.3	.534	5.80	3.77	.61

All the Hygrometrical elements are computed by the Greenwich Constants.



# Meteorological Observations

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## Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of February 1874.

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.959	30.125	29.767	0.358	69.1	75.2	61.0	14.2
1	.947	.119	.759	.360	68.5	75.0	60.3	14.7
2	.934	.110	.754	.356	67.9	74.5	59.8	14.7
3	.924	.092	.744	.348	67.5	74.2	59.2	15.0
4	.914	.075	.718	.357	67.1	74.0	58.5	15.5
5	.925	.084	.742	.342	66.7	73.5	58.0	15.5
6	.943	.096	.755	.341	66.4	73.2	57.5	15.7
7	.966	.118	.771	.347	66.3	73.5	57.0	16.5
8	.993	.144	.793	.351	67.6	74.4	59.5	14.9
9	30.018	.168	.821	.347	70.4	76.9	63.0	13.9
10	.030	.182	.834	.348	72.9	80.0	64.5	15.5
11	.018	.168	.817	.351	75.3	83.0	65.0	18.0
Noon.	29.996	.161	.798	.363	77.2	85.0	67.0	18.0
1	.966	.115	.770	.345	78.5	86.6	68.5	18.1
2	.937	.093	.733	.360	79.2	87.6	68.0	19.6
3	.919	.071	.716	.355	79.7	89.0	68.8	20.2
4	.906	.059	.703	.356	79.6	89.3	69.0	20.3
5	.908	.055	.708	.347	78.3	86.5	67.5	19.0
6	.917	.068	.721	.347	75.9	83.0	65.5	17.5
7	.931	.078	.748	.330	73.9	80.0	64.5	15.5
8	.950	.099	.759	.340	72.5	79.5	64.3	15.2
9	.965	.119	.774	.345	71.4	78.6	64.3	14.3
10	.974	.135	.777	.358	70.5	78.0	63.2	14.8
11	.970	.135	.771	.364	69.8	75.5	62.2	13.3

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	66.5	2.6	66.4	4.7	0.605	6.67	1.11	0.86
1	66.1	2.4	64.2	4.3	.601	.64	.01	.87
2	65.7	2.2	63.9	4.0	.595	.58	0.93	.88
3	65.3	2.2	63.5	4.0	.588	.50	.92	.88
4	65.1	2.0	63.5	3.6	.588	.50	.82	.89
5	64.8	1.9	63.3	3.4	.584	.47	.76	.90
6	64.5	1.9	63.0	3.4	.578	.41	.76	.89
7	64.4	1.9	62.9	3.4	.576	.39	.76	.89
8	65.0	2.6	62.9	4.7	.576	.37	1.07	.86
9	66.1	4.3	62.7	7.7	.572	.29	.81	.78
10	66.8	6.1	61.9	11.0	.557	.09	2.64	.70
11	67.3	8.0	61.7	13.6	.554	.02	3.38	.64
Noon.	68.0	9.2	61.6	15.6	.552	5.97	.98	.60
1	68.5	10.0	61.5	17.0	.550	.95	4.40	.58
2	68.6	10.6	61.2	18.0	.544	.88	.68	.56
3	69.0	10.7	61.5	18.2	.550	.94	.78	.55
4	69.0	10.6	61.6	18.0	.552	.95	.74	.56
5	68.7	9.6	62.0	16.3	.559	6.05	.23	.59
6	69.3	6.6	64.7	11.2	.611	.65	2.92	.70
7	68.6	5.3	64.9	9.0	.615	.73	.28	.75
8	68.1	4.4	64.6	7.9	.609	.67	1.96	.77
9	67.5	3.9	64.4	7.0	.605	.65	.70	.80
10	67.0	3.5	64.2	6.3	.601	.61	.52	.81
11	66.9	2.9	64.6	5.2	.609	.71	.24	.84

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<sup>o</sup>	Inches.		lb	Miles.	
1	124.0	0.80	E N E & Variable	1.0	208.9	O to 7 A. M., \i to 5 P. M. O to 11 P. M. T & L at 6½ A. M. R from 6 to 7 A. M.
2	132.0	0.15	E by N & W by S	...	154.2	O to 6 A. M., \i to 9 A. M., \i & \i to 11 P. M. Slightly foggy from 7 to 9 & at 11 P. M. Slight R from midnight to 5 A. M.
3	109.8	...	W N W & E by N	...	93.6	B to 1 A. M., \i to 1 P. M., \i to 4 P. M. B to 11 P. M. Foggy from midnight to 3 A. M.
4	133.4	...	E by N & E	...	126.3	B to 1 P. M., \i & \i to 5 P. M. B to 7 P. M., \i to 11 P. M. D at 10½ P. M.
5		2.01	E & E by S	1.4	102.7	\i to 2 A. M. O to 11 P. M. T & L at 5, 6 A. M. 6 & 7 P. M. R nearly the whole day.
6	97.0	0.16	E & E by N	...	223.8	\i to 1 A. M. O to 4 P. M. B to 11 P. M. Slightly foggy from 9 to 11 P. M. Slight R at 3, 5½ & 8 A. M.
7	136.0	...	E by N & N W	...	75.2	B to 1 A. M., \i & \i to 1 P. M. B to 11 P. M. Slightly foggy at midnight & 1 A. M. & from 7 to 10 P. M.
8	130.7	...	W & W by N	...	86.3	B Slightly foggy at 7 A. M. & from 9 to 11 P. M.
9	136.2	...	W N W & S S W	...	55.8	B.
10	138.8	...	S S W	...	99.4	B to 7 A. M. O to 10 A. M., \i to 4 P. M. B to 11 P. M. Slightly foggy at 6 & 7 A. M.
11	132.8	...	S S W & S W	3.5	199.8	B to 2 A. M. O to 8 A. M., \i to 7 P. M. B to 11 P. M.
12	131.0	...	S W & N by W	...	195.2	\i to 2 A. M. O to 7 A. M., \i to 4 P. M. B to 11 P. M.
13	123.4	...	N E & E by N	...	128.4	B to 4 A. M., \i to 9 P. M. O to 11 P. M. L at 11½ P. M. D at 11½ P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning, R rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Mile.	
14	129.5	0.63	S E & N W	3.0	158.4	☁ i to 5 A. M. O to 9 A. M., ☁ i to 4 P. M. B to 11 P. M. T & Hailstone at 1 A. M. L from midnight to 5 A. M. R from midnight to 1 A. M.
15	130.0	...	N & N E	0.5	198.9	B.
16	131.2	...	N E & N W	...	86.2	B.
17	128.5	...	N W, N N W & W	...	81.9	B. Slightly foggy from 8 to 10 P. M.
18	135.5	...	W S W, S W & S S W	...	81.1	B.
19	138.0	...	S S W & W by S	...	153.8	B.
20	135.5	...	S S W & S W	...	73.1	B to 3 A. M. O to 8 A. M. B to 11 P. M. Foggy from 1 to 5 A. M. O to 6 A. M. Scuds to 9 A. M. B to 12 A. M., ☁ i & ☁ i to 7 P. M. B to 11 P. M. Slightly foggy at midnight.
21	138.0	...	S W	3.0	130.3	B to 7 A. M. clouds of different kinds to 11 P. M. Foggy at 6 & 7 A. M.
22	142.0	...	S S W	...	156.2	☁ i & ☁ i to 12 A. M. O to 7 P. M. S to 11 P. M.
23	128.0	...	S, S W & N	0.4	128.5	O to 10 A. M., ☁ i to 8 P. M. B to 11 P. M.
24	136.2	...	S S W & variable	...	85.0	B.
25	135.0	...	S W & W by S	...	116.0	B to 5 A. M., ☁ i to 1 P. M.
26	134.0	0.02	Variable	...	80.7	☁ i to 6 P. M. O to 9 P. M. ☁ i to 11 P. M. Light R at 7½ & 8½ P. M.
27	132.0	...	W S W & W by N	...	76.0	B to 6 A. M. O to 8 A. M., ☁ i to 6 P. M. B to 11 P. M.
28	136.0	...	W S W & W	...	59.8	B to 2 P. M., ☁ i 4 P. M. B to 11 P. M. Foggy from 5 to 7 A. M.

☁ i Cirri,—i Strati, ☁ i Cumuli, ☁ i Cirro-strati, ☁ i Cumulo-strati, ☁ i Nimbi,  
☁ i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning  
R. rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1874.*

MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.955
Max. height of the Barometer occurred at 10 A. M. on the 16th ...	30.182
Min. height of the Barometer occurred at 4 P. M. on the 10th ...	29.708
Extreme range of the Barometer during the month ...	0.479
Mean of the daily Max. Pressures ... ..	30.035
Ditto ditto Min. ditto ... ..	29.892
Mean daily range of the Barometer during the month ...	0.143

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	°
Mean Dry Bulb Thermometer for the month ... ..	72.2
Max. Temperature occurred at 4 P. M. on the 22nd ...	89.3
Min. Temperature occurred at 7 A. M. on the 16th... ..	57.0
Extreme range of the Temperature during the month ...	32.3
Mean of the daily Max. Temperature ... ..	80.1
Ditto ditto Min. ditto, ... ..	65.9
Mean daily range of the Temperature during the month ...	14.2

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Mean Wet Bulb Thermometer for the month ... ..	66.9
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	5.3
Computed Mean Dew-point for the month ... ..	62.7
Mean Dry Bulb Thermometer above computed mean Dew-point ...	9.5

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.572

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	Troy grain.
Mean Weight of Vapour for the month ... ..	6.26
Additional Weight of Vapour required for complete saturation ...	2.29
Mean degree of humidity for the month, complete saturation being unity	0.73

	°
Mean Max. Solar radiation Thermometer for the month ... ..	130.9

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	Inches.
Rained 8 days,—Max. fall of rain during 24 hours ... ..	2.01
Total amount of rain during the month ... ..	3.77
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	3.17
Prevailing direction of the Wind ... S. S. W., S. W. & E. by N.	

Height 70 feet 10 inches above ground.



### MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

### *Meteorological Observations.*

[illegible]



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1874.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.985	30.058	29.911	0.147	74.5	85.7	64.0	21.7
2	.932	.024	.845	.179	75.8	86.2	66.2	20.0
3	.839	29.902	.776	.126	76.7	86.0	69.0	17.0
4	.854	.914	.804	.110	78.2	89.5	71.0	18.5
5	.915	30.004	.865	.139	76.7	85.7	72.0	13.7
6	.885	29.975	.828	.147	75.2	83.5	69.5	14.0
7	.843	.931	.761	.170	76.7	86.8	70.5	16.3
8	.834	.901	.779	.122	75.5	86.6	68.8	17.8
9	.803	.871	.734	.137	78.3	88.0	71.5	16.5
10	.849	.913	.794	.119	79.0	87.0	73.5	13.5
11	.968	30.052	.876	.176	76.3	83.5	71.0	12.5
12	.970	.071	.882	.189	74.0	86.4	63.7	22.7
13	.908	29.997	.832	.165	74.1	86.0	63.4	22.6
14	.835	.910	.766	.144	76.8	90.2	65.5	24.7
15	.829	.921	.766	.155	79.8	92.0	71.8	20.2
16	.883	.980	.813	.167	72.8	76.0	70.0	6.0
17	.823	.902	.736	.166	74.6	82.8	68.8	14.0
18	.736	.819	.677	.142	78.7	86.0	73.0	13.0
19	.761	.832	.707	.125	78.0	86.3	71.8	14.5
20	.754	.845	.682	.163	77.2	88.3	68.5	19.8
21	.835	.917	.733	.184	78.6	88.0	70.0	18.0
22	.850	.939	.762	.177	79.0	88.6	71.4	17.2
23	.714	.784	.635	.149	79.6	88.0	72.4	15.6
24	.654	.717	.580	.137	81.5	91.3	76.5	14.8
25	.708	.780	.634	.146	82.7	93.5	75.2	18.3
26	.801	.882	.711	.171	81.8	91.2	75.0	16.2
27	.868	.958	.807	.151	81.8	92.6	75.0	17.6
28	.847	.936	.764	.172	80.5	93.0	68.8	24.2
29	.811	.897	.726	.171	81.9	94.0	74.0	20.0
30	.793	.861	.737	.124	83.6	96.4	73.0	23.4
31	.772	.856	.689	.167	84.0	95.8	75.0	20.8

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	65.2	9.3	58.7	15.8	0.501	5.46	3.72	0.60
2	67.1	8.7	61.0	14.8	.541	.88	.66	.62
3	68.9	7.8	63.4	13.3	.586	6.36	.44	.65
4	71.4	6.8	66.6	11.6	.651	7.04	.21	.69
5	70.1	6.6	65.5	11.2	.628	6.83	2.97	.70
6	68.2	7.0	63.3	11.9	.584	.35	3.02	.68
7	66.5	10.2	59.4	17.3	.513	5.56	4.24	.57
8	69.7	5.8	65.6	9.9	.330	6.86	2.60	.73
9	74.2	4.1	71.3	7.0	.758	8.21	.07	.80
10	74.8	4.2	71.9	7.1	.773	.36	.14	.80
11	66.1	10.2	59.0	17.3	.506	5.50	4.19	.57
12	60.9	13.1	51.7	22.3	.396	4.32	.72	.48
13	62.6	11.5	54.5	19.6	.435	.74	.33	.52
14	66.1	10.7	58.6	18.2	.499	5.42	.41	.55
15	71.2	8.6	65.2	14.6	.621	6.70	.05	.62
16	70.0	2.8	67.8	5.0	.677	7.41	1.30	.85
17	69.2	5.4	65.4	9.2	.626	6.82	2.38	.74
18	72.1	6.6	67.5	11.2	.670	7.26	3.15	.70
19	67.6	10.4	60.3	17.7	.528	5.72	4.47	.56
20	68.1	9.1	61.7	15.5	.554	.99	3.96	.60
21	70.9	7.7	65.5	13.1	.628	6.80	.58	.66
22	72.2	6.8	67.4	11.6	.668	7.21	.29	.69
23	75.0	4.6	71.8	7.8	.771	8.31	2.38	.78
24	76.8	4.7	73.5	8.0	.814	.76	.55	.78
25	74.9	7.8	69.4	13.3	.713	7.66	4.06	.65
26	73.6	8.2	67.9	13.9	.679	.30	.10	.64
27	71.2	10.6	63.8	18.0	.593	6.37	5.03	.56
28	70.4	10.1	63.3	17.2	.584	.29	4.69	.57
29	72.1	9.8	65.2	16.7	.621	.68	.76	.58
30	71.7	11.9	63.4	20.2	.586	.27	5.76	.52
31	77.7	6.3	73.3	10.7	.809	8.65	3.52	.71

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Falt.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid- night.	29.841	30.009	29.661	0.348	73.8	78.6	67.0	11.6
1	.830	.000	.651	.349	73.3	78.0	66.4	11.6
2	.817	29.994	.644	.350	72.9	77.5	65.9	11.6
3	.806	.980	.634	.346	72.5	77.3	65.2	12.1
4	.801	.976	.629	.347	72.0	77.2	64.6	12.6
5	.818	.984	.639	.345	71.6	77.0	64.1	12.9
6	.836	.998	.655	.343	71.1	76.5	63.4	13.1
7	.858	30.012	.686	.326	71.3	77.0	63.7	13.3
8	.888	.048	.704	.344	73.2	79.6	67.5	12.1
9	.907	.059	.715	.344	76.6	82.5	70.3	12.2
10	.912	.071	.717	.354	79.6	86.4	71.5	14.9
11	.903	.053	.714	.339	82.7	90.8	72.6	18.2
Noon.	.877	.027	.690	.337	84.8	93.0	72.0	21.0
1	.847	.001	.651	.350	86.4	94.3	72.9	21.4
2	.816	29.985	.629	.356	87.2	95.5	74.4	21.1
3	.790	.957	.597	.360	87.8	96.4	73.5	22.9
4	.779	.950	.591	.359	87.3	96.4	73.0	23.4
5	.774	.955	.580	.375	86.1	95.4	72.9	22.5
6	.781	.965	.589	.376	82.8	92.0	72.0	20.0
7	.797	.976	.625	.351	79.5	86.7	71.0	15.7
8	.816	30.000	.644	.356	77.7	84.0	70.8	13.2
9	.835	.014	.675	.339	76.3	82.0	70.9	11.1
10	.845	.019	.680	.339	75.5	80.5	70.0	10.5
11	.846	.013	.673	.340	74.8	79.6	68.5	11.1

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	70.2	3.6	67.7	6.1	0.674	7.37	1.61	0.82
1	69.9	3.4	67.2	6.1	.664	.26	.58	.82
2	69.6	3.3	67.0	5.9	.659	.21	.52	.83
3	69.3	3.2	66.7	5.8	.653	.14	.49	.83
4	69.2	2.8	67.0	5.0	.659	.23	.27	.85
5	68.8	2.8	66.6	5.0	.651	.14	.26	.85
6	68.6	2.5	66.6	4.5	.651	.14	.14	.86
7	68.6	2.7	66.4	4.9	.646	.10	.23	.85
8	69.4	3.8	66.4	6.8	.646	.07	.75	.80
9	70.4	6.2	66.1	10.5	.640	6.94	2.83	.71
10	70.8	8.8	64.6	15.0	.609	.58	4.11	.62
11	70.8	11.9	62.5	20.2	.568	.10	5.62	.52
Noon.	70.6	14.2	60.7	24.1	.536	5.71	6.75	.46
1	70.6	15.8	59.5	26.9	.515	.47	7.59	.42
2	70.9	16.3	61.1	26.1	.543	.77	.60	.43
3	70.8	17.0	60.6	27.2	.534	.66	.94	.42
4	70.5	16.8	60.4	26.9	.530	.63	.78	.42
5	71.1	15.0	60.6	25.5	.534	.57	.38	.43
6	71.7	11.1	63.9	18.9	.595	6.38	5.37	.54
7	71.1	8.4	65.2	14.3	.621	.72	3.94	.63
8	70.5	7.2	65.5	12.2	.628	.81	.29	.67
9	70.3	6.0	66.1	10.2	.640	.96	2.73	.72
10	70.6	4.9	67.2	8.3	.664	7.23	.23	.76
11	70.7	4.1	67.8	7.0	.677	.38	1.88	.80

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<sup>o</sup> Inches			lb	Miles.	
1	134.5	...	W by S, W S W & S W	...	72.5	B to 12 A. M., \i to 11 P. M.
2	139.0	...	SW & WSW	...	73.2	B to 4 P. M., \i to 11 P. M.
3	134.0	...	S by W & S W	...	63.9	\i to 11 A. M. S to 3 P. M., \i to 11 P. M. Foggy at 3, 4 & 6 A. M.
4	145.9	...	S W & S S W	...	35.8	\i. Foggy from 4 to 8 A. M.
5	131.9	...	S by W & S W	...	40.1	\i to 4 A. M. O to 11 A. M., \i to 3 P. M. B to 7 P. M., \i to 9 P. M. B to 11 P. M. D at 10 A. M.
6	132.2	...	S W & W S W	8.0	60.4	B to 6 A. M., \i & \i to 3 P. M. O to 9 P. M. \i to 11 P. M. Brisk wind from 12 A. M. to 3½ P. M. D at 3½ & 9 P. M.
7	134.5	0.41	S by W & N N W	6.2	151.8	\i to 1 A. M. O to 9 A. M. \i to 12 A. M., \i & \i to 8 P. M. S to 11 P. M. Brisk wind from 6½ to 7½ A. M. & at 11 P. M. T at 11 P. M. L from 8 to 11 P. M. Slight R at 3, 6 & 7½ A. M. & between 10 & 11 P. M.
8	134.5	0.78	S	18.0	91.0	O to 4 A. M., \i to 8 A. M. B to 12 A. M., \i to 11 P. M. High wind from 5½ to 6½ P. M. T at 5½ & 6 P. M. L from 5½ to 11½ P. M. Hail stone at 6 P. M. R at 6 & 9½ P. M.
9	137.5	...	S W & W	0.9	129.2	Chiefly B.
10	140.0	0.09	W S W	...	93.0	\i to 1 A. M. S to 7 A. M., \i to 3 P. M. B to 5 P. M. S to 8 P. M. B to 11 P. M. T at 7 P. M. L from 6½ to 8 P. M. Slight R at 7½ P. M.
11	134.0	...	...	...	285.1	B. Foggy from 3 to 5 A. M.
12	134.2	...	N	...	168.6	B. Slightly foggy from 7 to 10 P. M.
13	140.0	...	WNW, NW & SW	...	124.2	B.
14	142.0	...	W S W & S W	...	82.8	B.
15	140.5	...	S W & S S E	...	111.7	B to 1 P. M. \i to 4 P. M. B to 11 P. M.

\i Cirri, —i Strati, ^i Cumuli, \i Cirro-strati, ^i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning, R rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	70.2	3.6	67.7	6.1	0.674	7.37	1.61	0.82
1	69.9	3.4	67.2	6.1	.664	.26	.58	.82
2	69.6	3.3	67.0	5.9	.659	.21	.52	.83
3	69.3	3.2	66.7	5.8	.653	.14	.49	.83
4	69.2	2.8	67.0	5.0	.659	.23	.27	.85
5	68.8	2.8	66.6	5.0	.651	.14	.26	.85
6	68.6	2.5	66.6	4.5	.651	.14	.14	.86
7	68.6	2.7	66.4	4.9	.646	.10	.23	.85
8	69.4	3.8	66.4	6.8	.646	.07	.75	.80
9	70.4	6.2	66.1	10.5	.640	6.94	2.83	.71
10	70.8	8.8	64.6	15.0	.609	.58	4.11	.62
11	70.8	11.9	62.5	20.2	.568	.10	5.62	.52
Noon.	70.6	14.2	60.7	24.1	.536	5.71	6.75	.46
1	70.6	15.8	59.5	26.9	.515	.47	7.59	.42
2	70.9	16.3	61.1	26.1	.543	.77	.60	.43
3	70.8	17.0	60.6	27.2	.534	.66	.94	.42
4	70.5	16.8	60.4	26.9	.530	.63	.78	.42
5	71.1	15.0	60.6	25.5	.534	.57	.38	.43
6	71.7	11.1	63.9	18.9	.595	6.38	5.37	.54
7	71.1	8.4	65.2	14.3	.621	.72	3.94	.63
8	70.5	7.2	65.5	12.2	.628	.81	.29	.67
9	70.3	6.0	66.1	10.2	.640	.96	2.73	.72
10	70.6	4.9	67.2	8.3	.664	7.23	.23	.76
11	70.7	4.1	67.8	7.0	.677	.38	1.88	.80

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*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<sup>o</sup> Inches		[S W	lb	Miles.	
1	134.5	...	W by S, W S W &	...	72.5	B to 12 A. M., \i to 11 P. M.
2	139.0	...	SW & WSW	...	73.2	B to 4 P. M., \i to 11 P. M.
3	134.0	...	S by W & S W	...	63.9	\i to 11 A. M. S to 3 P. M., \i to 11 P. M. Foggy at 3, 4 & 6 A. M.
4	145.9	...	S W & S S W	...	35.8	\i. Foggy from 4 to 8 A. M.
5	131.9	...	S by W & S W	...	40.1	\i to 4 A. M. O to 11 A. M., \i to 3 P. M. B to 7 P. M., \i to 9 P. M. B to 11 P. M. D at 10 A. M.
6	132.2	...	S W & W S W	8.0	60.4	B to 6 A. M., \i & \i to 3 P. M. O to 9 P. M. \i to 11 P. M. Brisk wind from 12 A. M. to 3½ P. M. D at 3½ & 9 P. M.
7	134.5	0.41	S by W & N N W	6.2	151.8	\i to 1 A. M. O to 9 A. M. \i to 12 A. M., \i & \i to 8 P. M. S to 11 P. M. Brisk wind from 6½ to 7½ A. M. & at 11 P. M. T at 11 P. M. L from 8 to 11 P. M. Slight R at 3, 6 & 7½ A. M. & between 10 & 11 P. M.
8	134.5	0.78	S	18.0	91.0	O to 4 A. M., \i to 8 A. M. B to 12 A. M., \i to 11 P. M. High wind from 5½ to 6½ P. M. T at 5½ & 6 P. M. L from 5½ to 11½ P. M. Hail stone at 6 P. M. R at 6 & 9½ P. M.
9	137.5	...	S W & W	0.9	129.2	Chiefly B.
10	140.0	0.09	W S W	...	93.0	\i to 1 A. M. S to 7 A. M., \i to 3 P. M. B to 5 P. M. S to 8 P. M. B to 11 P. M. T at 7 P. M. L from 6½ to 8 P. M. Slight R at 7½ P. M.
11	134.0	...	...	...	285.1	B. Foggy from 3 to 5 A. M.
12	134.2	...	N	...	168.6	B. Slightly foggy from 7 to 10 P. M.
13	140.0	...	WNW. NW & SW	...	124.2	B.
14	142.0	...	W S W & S W	...	82.8	B.
15	140.5	...	S W & S S E	...	111.7	B to 1 P. M. \i to 4 P. M. B to 11 P. M.

\i Cirri,—i Strati, ^i Cumuli, \i Cirro-strati, ^i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning, R rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Mile.	
16	...	0.40	S S E & variable	...	129.2	B to 2 A. M. O to 11 P. M. T between 7 & 8, 10 & 11 A. M., & at 10 P. M. L at 7½ A. M. & between 10 & 11 P. M. Slight R after intervals.
17	135.0	0.10	Variable.	1.0	146.5	O to 11 A. M., \i to 4 P. M., \i to 8 P. M., \i to 11 P. M. T at 4½ P. M., L at 7, 8 & 10 P. M. Slight R at 1, 3½ A. M. 3 & 7½ P. M.
18	139.0	...	SSW, WSW & S	...	152.1	\i to 7 A. M. B to 10 A. M. \i to 8 P. M. B to 11 P. M. L at midnight & from 7 to 9 P. M.
19	139.0	...	S & N W	...	77.8	B to 5 P. M. \i & \i to 11 P. M.
20	140.0	...	E by N & S W	...	61.6	\i to 4 A. M. O to 8 A. M., \i to 6 P. M., \i to 9 P. M. B to 11 P. M. L from 6½ to 9 P. M. D at 8 P. M.
21	143.5	...	E & E N E	...	112.6	B to 2 A. M. \i to 6 A. M. B to 9 A. M., \i to 7 P. M. B to 11 P. M.
22	145.0	...	S E & S W	...	57.2	B to 7 A. M., \i to 4 P. M., \i to 7 P. M. B to 11 P. M.
23	142.2	...	S & S S W	1.7	186.3	B to 6 A. M., scuds to 9 A. M., \i to 6 P. M. B to 11 P. M. Brisk wind nearly the whole day,
24	140.0	0.16	S by W & S S W	7.5	316.4	B to 3 A. M., \i to 10 A. M., \i to 6 P. M. B to 8 P. M., scuds to 11 P. M. Strong wind from 9 A. M. to 5½ P. M. T, L & hail-stone between 3 & 4 P. M. R at 9½ A. M. & 3½ P. M.
25	148.3	...	S S W & S by W	0.2	268.3	B.
26	140.2	...	S W & N by W	...	138.7	B to 2 A. M. S to 8 A. M. B to 11 P. M.
27	145.0	...	W S W & N W	...	90.1	B to 2 A. M. S to 6 A. M. B to 11 P. M.
28	141.5	...	S W, & S S W	...	113.3	B. Slightly foggy at 6 & 7 A. M.
29	144.0	...	S S W, S W & W	...	152.3	Chiefly B. Slightly foggy at 4 & 5 A. M.
30	146.0	...	S W & W	0.3	129.5	B.
31	145.5	...	S by W & S	...	141.0	B. Slightly foggy at 5 A. M.

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,  
\i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning  
R. rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1874.*

MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.834
Max. height of the Barometer occurred at 10 A. M. on the 12th ... ..	30.071
Min. height of the Barometer occurred at 5 P. M. on the 24th ... ..	29.580
Extreme range of the Barometer during the month ... ..	0.491
Mean of the daily Max. Pressures ... ..	29.914
Ditto ditto Min. ditto ... ..	29.762
Mean daily range of the Barometer during the month ... ..	0.152

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	°
Mean Dry Bulb Thermometer for the month ... ..	78.2
Max. Temperature occurred at 3 & 4 P. M. on the 30th ... ..	96.4
Min. Temperature occurred at 6 A. M. on the 13th ... ..	63.4
Extreme range of the Temperature during the month ... ..	33.0
Mean of the daily Max. Temperature ... ..	88.2
Ditto ditto Min. ditto, ... ..	70.6
Mean daily range of the Temperature during the month ... ..	17.6

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Mean Wet Bulb Thermometer for the month ... ..	70.2
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ... ..	8.0
Computed Mean Dew-point for the month ... ..	64.6
Mean Dry Bulb Thermometer above computed mean Dew-point ... ..	13.6

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.609

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	Troy grain.
Mean Weight of Vapour for the month ... ..	6.59
Additional Weight of Vapour required for complete saturation ... ..	3.66
Mean degree of humidity for the month, complete saturation being unity ... ..	0.64

	°
Mean Max. Solar radiation Thermometer for the month ... ..	139.6

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	Inches.
Rained 9 days,—Max. fall of rain during 24 hours ... ..	0.78
Total amount of rain during the month ... ..	1.94
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	1.52
Prevailing direction of the Wind ... S. W., S. S. W. & W. S. W.	

\* Height 70 feet 10 inches above ground.



### MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew. together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1874.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observation and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 33° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.721	20.785	29.648	0.137	84.5	94.2	78.5	15.7
2	.751	.821	.690	.131	84.3	94.0	78.5	15.5
3	.810	.884	.759	.125	82.6	89.4	77.8	11.6
4	.801	.873	.721	.152	84.6	92.8	80.0	12.8
5	.782	.855	.709	.146	83.8	93.5	75.8	17.7
6	.830	.900	.765	.135	82.8	90.7	75.6	15.1
7	.865	.940	.809	.131	82.5	91.0	76.5	14.5
8	.822	.902	.739	.163	82.4	90.0	77.0	13.0
9	.766	.822	.692	.130	83.7	93.2	75.7	17.5
10	.805	.873	.740	.133	84.7	93.7	77.4	16.3
11	.818	.900	.731	.169	86.7	99.8	78.6	21.2
12	.791	.890	.683	.207	88.3	103.5	79.4	24.1
13	.757	.835	.674	.161	86.8	98.6	79.5	19.1
14	.738	.810	.655	.155	87.4	98.2	80.0	18.2
15	.797	.860	.739	.121	86.2	95.0	80.0	15.0
16	.831	.912	.751	.161	85.6	94.3	79.5	14.8
17	.777	.856	.687	.169	86.7	98.5	78.7	19.8
18	.723	.795	.638	.157	87.1	99.2	78.5	20.7
19	.690	.740	.634	.106	86.4	95.6	80.8	14.8
20	.718	.783	.658	.125	86.2	94.5	80.5	14.0
21	.766	.832	.690	.142	85.8	93.7	80.0	13.7
22	.700	.773	.609	.164	87.3	96.4	80.5	15.9
23	.667	.721	.615	.106	87.5	99.7	79.6	20.1
24	.745	.820	.665	.155	84.8	92.5	79.0	13.5
25	.777	.857	.711	.146	87.5	98.8	80.4	18.4
26	.766	.843	.684	.159	85.3	94.3	78.5	15.8
27	.771	.838	.660	.178	84.3	92.5	71.0	21.5
28	.805	.908	.722	.186	80.8	91.9	70.5	21.4
29	.725	.815	.649	.166	84.3	94.0	74.8	19.2
30	.724	.804	.627	.177	82.8	95.0	73.2	21.8

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



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in the month of April 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of a.r.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	78.6	5.9	74.5	10.0	.840	9.00	3.35	0.73
2	78.7	5.6	74.8	9.5	.849	.07	.21	.74
3	77.8	4.8	74.4	8.2	.838	.00	2.68	.77
4	78.7	5.9	74.6	10.0	.843	.02	3.37	.73
5	74.3	9.5	67.6	16.2	.672	7.20	4.90	.60
6	76.7	6.1	72.4	10.4	.785	8.43	3.32	.72
7	76.7	5.8	72.6	9.9	.790	.49	.15	.73
8	76.7	5.7	72.7	9.7	.792	.51	.10	.73
9	78.3	5.4	74.5	9.2	.840	9.01	.06	.75
10	79.7	5.0	76.2	8.5	.887	.49	2.93	.76
11	80.2	6.5	76.3	10.4	.890	.50	3.68	.72
12	79.6	8.7	74.4	13.9	.838	8.89	4.91	.64
13	80.6	6.2	76.9	9.9	.908	9.66	3.55	.73
14	80.3	7.1	76.0	11.4	.882	.39	4.06	.70
15	79.7	6.5	75.1	11.1	.867	.13	3.86	.70
16	78.8	6.8	74.0	11.6	.827	8.82	.94	.69
17	79.4	7.3	75.0	11.7	.854	9.09	4.09	.69
18	80.0	7.1	75.7	11.4	.873	.30	.03	.70
19	80.2	6.2	75.9	10.5	.879	.36	3.70	.72
20	80.5	5.7	76.5	9.7	.896	.56	.43	.74
21	80.4	5.4	76.6	9.2	.899	.59	.24	.75
22	81.3	6.0	77.7	9.6	.931	.90	.51	.74
23	81.5	6.0	77.9	9.6	.937	.96	.53	.74
24	79.4	5.4	75.6	9.2	.871	.31	.15	.75
25	79.2	8.3	74.2	13.3	.832	8.85	4.64	.66
26	79.4	5.9	75.3	10.0	.862	9.21	3.43	.73
27	78.1	6.2	73.8	10.5	.822	8.78	.50	.72
28	73.7	7.1	68.7	12.1	.697	7.51	.56	.68
29	75.7	8.6	69.7	14.6	.720	.69	4.59	.63
30	75.1	7.7	69.7	13.1	.720	.72	.03	.66

All the Hygrometrical elements are computed by the Greenwich Constants.



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in the month of April 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.771	29.867	29.666	0.201	80.7	84.5	72.0	12.5
1	.761	.855	.653	.202	80.2	82.8	72.0	10.8
2	.748	.850	.638	.212	79.8	82.5	72.8	9.7
3	.740	.846	.631	.215	79.4	82.5	73.3	9.2
4	.744	.908	.639	.269	78.9	81.8	71.5	10.3
5	.759	.896	.645	.251	78.4	80.8	70.5	10.3
6	.779	.888	.660	.228	78.4	81.0	70.5	10.5
7	.801	.899	.695	.204	79.3	82.0	71.5	10.5
8	.824	.927	.711	.216	81.7	84.5	76.3	8.2
9	.837	.940	.721	.219	84.9	87.8	81.0	6.8
10	.838	.938	.714	.224	87.8	91.9	84.2	7.7
11	.827	.921	.709	.212	90.7	95.2	86.8	8.4
Noon.	.808	.907	.698	.209	92.6	97.7	87.8	9.9
1	.779	.881	.680	.201	93.8	99.8	88.5	11.3
2	.751	.856	.663	.193	94.4	101.5	89.4	12.1
3	.723	.829	.635	.194	94.6	103.0	88.8	14.2
4	.705	.815	.621	.194	93.9	103.5	88.0	15.5
5	.696	.809	.609	.200	91.7	99.4	85.0	14.4
6	.706	.814	.618	.196	88.7	95.4	83.5	11.9
7	.728	.824	.634	.190	85.8	89.5	82.0	7.5
8	.751	.846	.655	.191	83.5	87.0	73.5	13.5
9	.778	.855	.673	.182	82.1	84.7	73.0	11.7
10	.791	.886	.677	.209	81.1	84.0	71.0	13.0
11	.784	.876	.674	.202	80.7	83.5	72.0	11.5

The Mean Height of the Barometer, as likewise the Dry and Wet  
Thermometer Means are derived from the observations made at all  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	77.3	3.4	74.9	5.8	0.853	9.17	1.87	0.83
1	77.3	2.9	75.3	4.9	.862	.31	.57	.86
2	77.1	2.7	75.2	4.6	.860	.28	.47	.86
3	76.9	2.5	75.1	4.3	.857	.27	.35	.87
4	76.7	2.2	75.2	3.7	.860	.30	.17	.89
5	76.5	1.9	75.2	3.2	.860	.31	.00	.90
6	76.5	1.9	75.2	3.2	.860	.31	.00	.90
7	77.1	2.2	75.6	3.7	.871	.40	.19	.89
8	78.0	3.7	75.4	6.3	.865	.32	2.05	.82
9	79.3	5.6	75.4	9.5	.865	.24	3.25	.74
10	80.0	7.8	75.3	12.5	.862	.16	4.44	.67
11	80.7	10.0	74.7	16.0	.846	8.93	5.87	.60
Noon.	80.8	11.8	73.7	18.9	.819	.62	7.01	.55
1	80.7	13.1	72.8	21.0	.795	.34	.84	.52
2	80.7	13.7	72.5	21.9	.787	.25	8.21	.50
3	80.7	13.9	72.4	22.2	.785	.22	.33	.50
4	80.6	13.3	72.6	21.3	.790	.30	7.92	.51
5	80.6	11.1	73.9	17.8	.824	.69	6.54	.57
6	79.9	8.8	74.6	14.1	.843	.94	5.02	.64
7	79.2	6.6	74.6	11.2	.843	9.00	3.83	.70
8	78.4	5.1	74.8	8.7	.849	.09	2.91	.76
9	78.0	4.1	75.1	7.0	.857	.21	.30	.80
10	77.4	3.7	74.8	6.3	.849	.15	.02	.82
11	77.1	3.6	74.6	6.1	.843	.09	1.95	.82

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.		General aspect of the Sky.
			Prevailing direction.	Max. Pressure Daily Velocity.	
		Inches		lb. Miles.	
1	147.0	...	S W & S	0.9 208.9	B to 2 A. M. S to 6 A. M. \i to 3 P. M. B to 7 P. M. Scuds to 11 P. M.
2	141.5	...	S S W & S W	0.3 189.2	Scuds to 2 A. M. B to 7 A. M., \i to 12 A. M. B to 3 P. M., \i to 5 P. M. B to 11 P. M.
3	136.5	...	S & S S W	2.0 169.7	Scuds to 9 A. M., \i to 8 P. M. B to 11 P. M. Brisk wind from 10 A. M. to 11 P. M. T at 5 P. M. L at 7 P. M. D at 5½ P. M.
4	144.0	...	S & S S W	1.0 258.5	Scuds to 9 A. M., \i to 2 P. M. B to 8 P. M. Scuds to 11 P. M.
5	145.0	...	S S W & S W	...	Scuds to 2 A. M. B to 11 P. M.
6	140.7	...	S by W & S	0.2 112.3	B to 6 A. M., \i to 1 P. M., \i to 3 P. M. B to 9 P. M. S to 11 P. M.
7	140.2	...	S S E & S by W	0.9 142.3	B to 2 A. M. Scuds to 6 A. M. \i to 3 P. M. B to 11 P. M.
8	142.2	...	S by W & S	0.3 211.9	B to 3 A. M. O to 6 A. M., \i to 12 A. M. B to 11 P. M.
9	147.0	...	S & S by E	...	Chiefly B.
10	146.0	...	S by E & S	0.8 182.7	Chiefly B.
11	148.0	...	S W & S S W	...	B to 2 A. M., scuds to 8 A. M. B to 8 P. M., \i to 11 P. M.
12	154.7	...	S S W & W S W	...	B to 2 A. M., Scuds to 7 A. M. B to 11 P. M.
13	144.6	...	S S E	0.2 126.2	B to 3 A. M., Scuds to 6 A. M. S to 9 A. M. B to 9 P. M. S to 11 P. M.
14	143.0	...	S by E & S S E	1.9 165.5	S to 3 A. M. B to 2 P. M., \i & \i to 4 P. M. B to 9 P. M., Scuds, to 11 P. M.
15	144.5	...	S	0.4 193.5	Clouds of Different kinds to 1 P. M. B to 11 P. M.
16	145.0	...	S S W	1.7 275.5	B. Brisk wind from 8½ A. M. to 5½ P. M.
17	145.9	...	S S W & S W	0.5 277.6	B.
18	150.0	...	S S W & S by W	1.0 258.4	Chiefly B. Brisk wind from 1 to 11 P. M.
19	145.0	...	S by W & S	0.8 242.4	B to 2 A. M., Scuds to 9 A. M. B to 4 P. M., \i to 7 P. M. Scud to 11 P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning, R rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Mile.	
20	144.0	...	S S W & S	0.5	268.2	B to 3 A. M., Scuds to 6 A. M., ∩i & ∩i to 11 P. M.
21	143.0	...	S S W & S	0.6	272.8	O to 3 A. M. B to 3 P. M. O to 7 P. M., ∩i to 9 P. M., Scuds to 11 P. M. L on W at 8 P. M.
22	148.0	...	S & S S W	0.3	260.5	B to 4 A. M., scuds to 9 A. M. B to 11 A. M., ∩i to 2 P. M. B to 4 P. M., ∩i to 11 P. M.
23	146.0	...	S & S by E	0.8	233.5	Scuds to 1 A. M. B to 5 A. M. S to 8 A. M. B to 2 P. M., ∩i to 7 P. M. B to 11 P. M.
24	145.0	0.20	S, S by W & S by E	0.3	207.3	Scuds to 1 A. M. B to 4 A. M., ∩i to 12 A. M. O to 7 P. M., ∩i to 11 P. M. T at 1½, 3 & 7 P. M. L on W at 7 P. M. Light R at 1, 3 & 6½ P. M.
25	149.5	...	S & S S W	0.4	146.1	S to 5 A. M., ∩i to 10 A. M., ∩i to 7 P. M., ∩i to 11 P. M.
26	146.0	...	S S E & S	0.9	206.6	Chiefly ∩i.
27	144.5	0.25	S S E & S S W	9.2	265.5	∩i to 7 A. M., ∩i to 11 P. M. High wind between 8 & 9 P. M. T at 9 P. M. L at 9 & 11 P. M. R between 8 & 9 P. M.
28	145.0	0.21	S & Variable	8.5	222.6	Clouds of different kinds to 4 A. M., ∩i to 7 A. M. B to 9 A. M., ∩i to 6 P. M. O to 11 P. M. High wind from 3½ to 4½ A. M., & 9½ to 11 P. M. L & Slight R between 3 & 4 A. M. & from 9½ to 11 P. M.
29	145.0	...	S & N N W	3.0	198.0	O to 5 A. M., ∩i to 2 P. M. B to 5 P. M. O to 11 P. M. High wind from Midnight to 1 A. M. & at 9½ P. M. T & L between 6 & 7 P. M.
30	142.0	0.81	S W & Variable	7.2	134.2	∩i to 1 A. M. B to 4 A. M., ∩i to 7 A. M. Scuds to 10 A. M. ∩i to 7 P. M. O to 11 P. M. High wind at 7½ P. M. T & L from 6½ to 11 P. M. R from 7½ to 10 P. M.

∩i Cirri,—i Strati, ∩i Cumuli, ∩i Cirro-strati, ∩i Cumulo-strati, ∩i Nimbi,  
∩i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning  
R. rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Survey and General Office, Columbia,  
in the month of May 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical Elements  
Independent of Wind.

Hour	Mean Height of the Barometer at 32° Fahr.	Range of the Thermometer during the hour.			Mean Dry Bulb Thermometer	Range of the 1st termi- nated observation during the hour.		
		Max.	Min.	P.M.		Max.	Min.	P.M.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
<b>Mid-</b>								
<b>night.</b>	.29.610	.29.752	.29.513	.29.282	82.4	86.0	73.6	12.2
1	.673	.787	.575	.2923	82.4	85.8	72.2	12.2
2	.694	.725	.574	.2935	81.0	85.5	72.2	12.6
3	.594	.715	.594	.2911	81.3	85.0	73.5	11.5
4	.593	.704	.466	.2908	81.3	84.4	73.5	10.9
5	.605	.720	.508	.2922	81.2	84.5	74.0	10.5
6	.622	.743	.520	.2923	81.3	84.5	74.8	9.7
7	.641	.754	.538	.2916	82.6	86.0	75.0	11.0
8	.657	.778	.554	.2924	85.2	88.0	76.7	8.3
9	.664	.780	.564	.2916	88.0	91.0	76.6	9.2
10	.694	.787	.567	.2920	90.4	94.0	85.6	9.4
11	.654	.774	.556	.2918	92.6	96.5	82.5	7.0
<b>Noon.</b>								
1	.636	.751	.534	.2917	94.1	99.2	88.2	11.0
2	.619	.731	.515	.2916	95.1	100.8	89.8	11.0
3	.595	.696	.480	.2907	95.6	101.5	90.5	11.0
4	.572	.675	.455	.2920	95.2	101.0	84.5	16.5
5	.552	.664	.452	.2912	94.4	99.0	84.5	14.5
6	.546	.654	.450	.2904	91.9	96.0	82.5	13.5
7	.559	.660	.461	.2909	89.2	92.5	79.0	13.5
8	.577	.670	.473	.2907	86.9	90.0	78.3	11.7
9	.603	.698	.487	.2911	85.5	88.0	78.2	9.8
10	.618	.718	.508	.2910	84.1	87.8	77.0	10.8
11	.627	.728	.528	.2900	83.4	87.0	76.5	10.5
12	.623	.711	.531	.29180	83.1	86.0	77.0	9.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the observations made at the several hours during the month.



Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1874.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.717	29.787	29.630	0.157	82.9	94.5	72.9	21.6
2	.688	.755	.609	.146	86.9	97.5	79.0	18.5
3	.664	.739	.596	.143	87.3	98.5	80.4	18.1
4	.638	.684	.587	.097	86.0	93.5	80.0	13.5
5	.675	.728	.617	.111	86.9	95.5	80.9	14.6
6	.690	.745	.619	.096	87.0	94.5	80.6	13.9
7	.680	.749	.624	.125	87.8	96.9	81.2	15.7
8	.623	.695	.545	.150	88.4	96.0	82.8	13.2
9	.605	.661	.550	.111	87.2	95.6	81.3	14.3
10	.597	.689	.513	.176	86.6	93.6	81.6	12.0
11	.538	.577	.457	.120	88.4	98.8	82.2	16.6
12	.580	.700	.510	.190	86.6	93.5	76.5	17.0
13	.664	.732	.577	.155	83.4	91.5	76.0	15.5
14	.684	.752	.628	.124	86.6	94.5	81.3	13.2
15	.619	.694	.518	.176	87.8	96.5	82.4	14.1
16	.528	.593	.450	.143	89.1	98.5	82.3	16.2
17	.549	.598	.496	.102	89.3	98.6	83.5	15.1
18	.580	.646	.513	.133	89.6	99.8	83.5	16.3
19	.547	.605	.459	.146	90.2	101.5	83.6	17.9
20	.518	.573	.452	.121	89.2	98.7	84.0	14.7
21	.515	.567	.456	.111	90.0	100.3	83.5	16.8
22	.539	.587	.480	.107	89.6	98.0	83.8	14.2
23	.590	.616	.522	.124	88.2	96.0	82.0	14.0
24	.612	.679	.528	.151	87.4	93.8	81.5	12.3
25	.621	.683	.522	.161	86.2	94.5	78.9	15.6
26	.616	.660	.519	.141	83.7	91.3	76.0	15.3
27	.608	.674	.537	.137	86.6	94.5	81.0	13.5
28	.624	.690	.556	.134	84.2	90.9	80.2	10.7
29	.564	.608	.457	.151	85.5	95.5	77.8	17.7
30	.589	.650	.524	.126	84.0	96.5	78.0	18.5
31	.672	.724	.616	.108	86.3	95.6	78.0	17.6

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	76.7	6.2	72.4	10.5	0.785	8.41	3.38	0.71
2	80.6	6.3	76.8	10.1	.905	9.63	.62	.73
3	80.6	6.7	76.6	10.7	.899	.56	.85	.71
4	78.8	7.2	73.8	12.2	.822	8.76	4.15	.68
5	80.2	6.7	76.2	10.7	.887	9.45	3.80	.71
6	80.0	7.0	75.8	11.2	.876	.33	.96	.70
7	80.3	7.5	75.8	12.0	.876	.31	4.29	.69
8	80.8	7.6	76.2	12.2	.887	.43	.41	.68
9	80.2	7.0	76.0	11.2	.882	.39	3.98	.70
10	80.4	6.2	76.7	9.9	.902	.60	.54	.73
11	81.1	7.3	76.7	11.7	.902	.56	4.28	.69
12	81.4	5.2	78.3	8.3	.949	10.12	3.02	.77
13	78.5	4.9	75.1	8.3	.857	9.19	2.77	.77
14	80.9	5.7	77.5	9.1	.925	.86	3.28	.75
15	81.6	6.2	77.9	9.9	.937	.96	.64	.73
16	82.2	6.9	78.1	11.0	.943	10.00	4.12	.71
17	83.1	6.2	79.4	9.9	.983	.41	3.80	.73
18	83.1	6.5	79.2	10.4	.976	.35	.98	.72
19	82.8	7.4	78.4	11.8	.952	.06	4.53	.69
20	83.1	6.1	79.4	9.8	.983	.41	3.75	.74
21	83.0	7.0	78.8	11.2	.964	.21	4.29	.70
22	81.7	7.9	77.0	12.6	.910	9.63	.70	.67
23	81.3	6.9	77.2	11.0	.916	.73	.03	.71
24	81.2	6.2	77.5	9.9	.925	.84	3.61	.73
25	79.7	6.5	75.1	11.1	.857	.13	.86	.70
26	79.0	4.7	75.7	8.0	.873	.36	2.71	.78
27	80.8	5.8	77.3	9.3	.919	.80	3.34	.75
28	80.1	4.1	77.2	7.0	.916	.81	2.43	.80
29	79.1	6.4	71.6	10.9	.843	.90	3.72	.71
30	77.9	6.1	73.6	10.4	.817	8.75	.42	.72
31	79.2	7.1	74.2	12.1	.832	.87	4.15	.68

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahrt.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.619	29.752	29.513	0.239	82.4	86.0	73.8	12.2
1	.613	.737	.515	.222	82.2	85.8	72.9	12.9
2	.604	.725	.510	.215	81.9	85.5	72.9	12.6
3	.594	.715	.504	.211	81.6	85.0	73.5	11.5
4	.593	.704	.496	.208	81.3	84.4	73.5	10.9
5	.605	.720	.508	.212	81.2	84.5	74.0	10.5
6	.622	.713	.520	.223	81.3	84.5	74.8	9.7
7	.641	.754	.538	.216	82.6	86.0	75.0	11.0
8	.657	.778	.554	.224	85.2	88.0	79.7	8.3
9	.664	.780	.564	.216	88.0	91.0	82.8	8.2
10	.664	.787	.567	.220	90.4	94.0	85.6	8.4
11	.654	.774	.556	.218	92.6	96.5	89.5	7.0
Noon.	.639	.751	.534	.217	94.1	99.2	88.2	11.0
1	.619	.731	.515	.216	95.1	100.8	89.8	11.0
2	.595	.696	.489	.207	95.6	101.5	90.5	11.0
3	.572	.675	.455	.220	95.2	101.0	84.5	16.5
4	.552	.664	.452	.212	94.4	99.0	84.5	14.5
5	.546	.654	.450	.204	91.9	96.0	82.5	13.5
6	.559	.660	.461	.199	89.2	92.5	79.0	13.5
7	.577	.670	.473	.197	86.9	90.0	78.3	11.7
8	.603	.698	.487	.211	85.5	88.0	78.2	9.8
9	.618	.718	.508	.210	84.1	87.8	77.0	10.8
10	.627	.728	.528	.200	83.4	87.0	76.5	10.5
11	.623	.711	.531	.180	83.1	86.0	77.0	9.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	79.2	3.2	77.0	5.4	0.910	9.79	1.82	0.84
1	79.2	3.0	77.1	5.1	.913	.82	.72	.85
2	78.9	3.0	76.8	5.1	.905	.73	.71	.85
3	78.8	2.8	76.8	4.8	.905	.73	.61	.86
4	78.7	2.6	76.9	4.4	.908	.78	.46	.87
5	78.6	2.6	76.8	4.4	.905	.75	.46	.87
6	78.8	2.5	77.0	4.3	.910	.81	.43	.87
7	79.6	3.0	77.5	5.1	.925	.94	.74	.85
8	80.7	4.5	77.5	7.7	.925	.88	2.73	.78
9	81.5	6.5	77.6	10.4	.928	.87	3.81	.72
10	82.1	8.3	77.1	13.3	.913	.66	5.01	.66
11	82.8	9.8	76.9	15.7	.908	.54	6.09	.61
Noon.	83.1	11.0	76.5	17.6	.896	.40	.92	.58
1	83.3	11.8	76.2	18.9	.887	.29	7.50	.55
2	82.9	12.7	75.3	20.3	.862	.02	8.01	.53
3	82.7	12.5	75.2	20.0	.860	.00	7.84	.53
4	82.2	12.2	74.9	19.5	.851	8.91	.55	.54
5	81.7	10.2	75.6	16.3	.871	9.18	6.14	.60
6	81.1	8.1	76.2	13.0	.887	.41	4.75	.67
7	80.5	6.4	76.7	10.2	.902	.60	3.65	.73
8	80.2	5.3	76.5	9.0	.896	.57	.15	.78
9	79.7	4.4	76.6	7.5	.899	.61	2.60	.79
10	79.4	4.0	76.6	6.8	.899	.63	.33	.81
11	79.5	3.6	77.0	6.1	.910	.77	.09	.82

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<sup>o</sup>	Inches		lb	Miles.	
1	146.3	...	S W & S	0.5	183.5	☁i to 7 A. M. B to 6 P. M. S to 11 P. M. Sheet L on Wat 7 P. M.
2	146.2	...	S S W & S	...	261.6	☁i to 2 A. M. B to 5 A. M. ☁i to 8 A. M. B to 11 P. M.
3	140.0	...	S S W & S by W	0.2	72.1	B.
4	144.4	...	S S W & S	1.0	24.7	B to 4 A. M., ☁i to 11 P. M.
5	147.0	...	S & S S W	0.8	224.4	☁i to 7 A. M., ☁i to 10 A. M., ☁i to 1 P. M. B to 3 P. M., ☁i to 6 P. M. B to 11 P. M.
6	144.2	...	S by W & S	1.0	209.5	Clouds of different kinds to 9 A. M., ☁i to 2 P. M. B to 11 P. M.
7	146.0	...	S by W & S W	0.7	263.2	Scuds to 4 A. M. B to 11 P. M.
8	145.2	...	S S W & S W	3.0	367.5	B to 4 P. M., ☁i to 7 P. M. B to 11 P. M. Brisk wind nearly the whole day.
9	144.0	0.08	S W	5.8	399.7	B to 4 A. M., ☁i to 7 A. M. B to 4 P. M., ☁i to 7 P. M. B to 11 P. M. Brisk wind the whole day. T & light R at 5½ A. M.
10	146.7	...	S W & S S W	6.0	438.7	B to 5 A. M., ☁i to 10 A. M., ☁i to 5 P. M. B to 11 P. M. Brisk wind the whole day L on N from 8 to 10 P. M.
11	147.0	0.04	S W & S S W	4.4	467.7	B to 4 A. M., ☁i to 11 A. M., clouds of different kinds to 11 P. M. Brisk wind from 3½ to 9½ P. M. L on S from 7 to 10 P. M. T & light R at 6 P. M.
12	139.0	0.08	S W	5.0	313.7	S to 4 A. M. Scuds to 3 P. M. S to 7 P. M. O to 11 P. M. Brisk wind nearly the whole day. L from 8 to 11 P. M. Light R from 8½ to 9½ P. M.
13	139.7	...	E by S, S & S by W	1.2	287.7	O to 4 A. M. S to 11 P. M. L from Midnight to 4 A. M. D at 5½ P. M.

☁i Cirri,—i Strati, ☁i Cumuli, ☁i Cirro-strati, ☁i Cumulo-strati, ☁i Nimbi, ☁i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning, R rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1874.*

## Solar Radiation, Weather, &amp;c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity	
	°	Inches.		lb	Mile.	
14	139.8	...	S by W & S S W	1.4	201.1	S to 3 A. M. Scuds to 6 A. M., ~i to 12 A. M., ~i to 8 P. M. S to 11 P. M. D at 3½ A. M.
15	143.0	...	S S W & S W	2.8	294.2	S to 3 A. M., ~i to 8 A. M. B to 4 P. M., ~i to 11 P. M. Brisk wind from 3 to 10½ P. M.
16	146.4	...	W S W & S by W	1.9	308.5	B to 4 A. M., ~i to 7 P. M. B to 9 P. M. Scuds to 11 P. M. Brisk wind from 5 to 7½ P. M.
17	143.7	...	S S W & S	1.2	317.5	Scuds to 1 A. M. B to 5 A. M. Scuds to 10 A. M., ~i to 1 P. M. B to 7 P. M., ~i to 11 P. M.
18	147.0	...	S S W & S	2.3	262.2	B to 7 A. M., Scuds to 10 A. M., ~i to 5 P. M. B to 1 P. M. Brisk wind from 5½ to 8½ P. M.
19	149.0	...	S by W & S	1.5	273.9	Scuds to 7 A. M. B to 2 P. M., ~i to 4 P. M. B. to 11 P. M. Brisk wind from 4 to 6 P. M.
20	145.0	...	S by W & S by E	1.4	290.9	B to 4 A. M., Scuds to 8 A. M. B to 12 A. M., clouds of different kinds to 11 P. M. Brisk wind from 8½ A. M. to 5½ P. M.
21	148.5	...	S & S S W	0.8	260.4	~i to 6 A. M. Scuds to 9 A. M. B to 11 P. M.
22	142.5	...	S & S by E	1.4	158.3	Scuds to 3 A. M. B to 6 A. M. Scuds to 9 A. M., ~i to 6 P. M. O to 11 P. M. Brisk wind from 12½ A. M. to 5 P. M.
23	143.0	...	S & S S W	1.9	338.7	B to 4 A. M., Scuds to 11 A. M., ~i to 4 P. M. O to 11 P. M. Brisk wind from 12 A. M. to 4½ P. M. Sheet L on W at 10 P. M. D at 6 P. M.
24	136.9	...	S & S S W	2.0	239.3	S to 1 A. M., ~i & ~i to 6 P. M. S to 11 P. M. Brisk wind from 10 A. M. to 7½ P. M. Sheet L at 2 A. M. & between 7 & 8 P. M. D at 2½ P. M.

~i Cirri, —i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi,  
~i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning  
R. rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1874.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
25	142.3	0.04	S S E & S S W	7.6	312.8	O to 5 A. M., \i to 11 A. M., \i to 6 P. M. S to 11 P. M. High wind from 8½ A. M. to 9½ P. M. T from 8½ to 10 P. M. L from 7½ to 11 P. M. Light R between 9 & 10 P. M.
26	138.0	0.85	S S W & S	5.2	302.2	O to 11 A. M., \i to 6 P. M. O to 11 P. M. Brisk wind from 11½ A. M. to 6 & at 8½ P. M. T & L from Midnight to 4 A. M. & 7 to 10 P. M. R from 1 to 5 A. M. & 8½ to 11 P. M.
27	146.2	...	S & S S W	...	291.4	O to 9 A. M., \i to 3 P. M. B to 5 P. M. S to 11 P. M. D at 8½ P. M.
28	143.0	...	S S W & Variable	2.9	181.1	\i & \i to 6 A. M. O to 10 A. M. \i to 3 P. M., \i to 8 P. M. B to 11 P. M. Brisk wind from 2 to 2½ P. M. T at 2 P. M. D at 7½, 8 9½ A. M. & 3 P. M.
29	146.5	...	S E & S by E	...	120.0	\i to 8 A. M., \i to 7 P. M. B to 11 P. M. T & D between 6 & 7 P. M.
30	144.0	0.07	W by N & S S E	4.0	110.0	O to 4 A. M., \i to 9 A. M. B to 11 A. M., \i to 4 P. M. O to 7 P. M. B to 11 P. M. Brisk wind from 4½ to 5 P. M. T at 1 A. M. & from 3 to 6½ P. M. L at 1 & 4 A. M. Light R at 3 A. M. 3, 5, 5½ & 6½ P. M.
31	147.5	...	S S E & S by E	...	143.2	B to 7 A. M., \i to 6 P. M. B to 11 P. M.

\i Cirri —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati \i Nimbi, \i Cirro-Cumuli, B clear, S stratoni, O overcast, T thunder, L lightning R rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
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MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.611
Max. height of the Barometer occurred at 10 A. M. on the 1st ... ..	29.787
Min. height of the Barometer occurred at 5 P. M. on the 16th ... ..	29.450
Extreme range of the Barometer during the month ... ..	0.337
Mean of the daily Max. Pressures ... ..	29.673
Ditto ditto Min. ditto ... ..	29.539
Mean daily range of the Barometer during the month ... ..	0.134

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	°
Mean Dry Bulb Thermometer for the month ... ..	87.1
Max. Temperature occurred at 2 P. M. on the 19th ... ..	101.5
Min. Temperature occurred at 1 & 2 A. M. on the 1st ... ..	72.9
Extreme range of the Temperature during the month ... ..	28.6
Mean of the daily Max. Temperature ... ..	96.0
Ditto ditto Min. ditto, ... ..	80.5
Mean daily range of the Temperature during the month ... ..	15.5

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Mean Wet Bulb Thermometer for the month ... ..	80.6
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ... ..	6.5
Computed Mean Dew-point for the month ... ..	76.7
Mean Dry Bulb Thermometer above computed mean Dew-point ... ..	10.4

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.902

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	Troy grain.
Mean Weight of Vapour for the month ... ..	9.60
Additional Weight of Vapour required for complete saturation ... ..	3.73
Mean degree of humidity for the month, complete saturation being unity ... ..	0.72

	°
Mean Max. Solar radiation Thermometer for the month ... ..	144.1

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	Inches.
Rained 13 days,—Max. fall of rain during 24 hours ... ..	0.85
Total amount of rain during the month ... ..	1.16
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ... ..	0.99
Prevailing direction of the Wind ... .. S. S. W, S. & S. W.	

\* Height 70 feet 10 inches above ground.



Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]







*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1874.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.739	29.804	29.680	0.124	87.8	97.0	80.5	16.5
2	.802	.860	.745	.115	86.6	95.3	81.2	14.1
3	.826	.875	.764	.111	85.2	96.7	80.5	16.2
4	.782	.847	.704	.143	81.9	87.0	80.0	7.0
5	.742	.812	.647	.165	84.2	90.1	79.4	10.7
6	.733	.769	.661	.108	81.2	88.3	79.0	9.3
7	.727	.793	.660	.133	82.5	88.0	79.0	9.0
8	.706	.766	.631	.135	81.8	87.6	77.0	10.6
9	.691	.745	.615	.130	82.5	90.2	78.0	12.2
10	.641	.689	.577	.112	80.7	88.0	77.0	11.0
11	.601	.645	.531	.114	83.7	91.9	79.0	12.9
12	.585	.635	.521	.114	85.8	93.4	80.3	13.1
13	.606	.652	.545	.107	86.9	93.0	81.5	11.5
14	.585	.636	.506	.130	85.4	94.8	82.0	12.8
15	.500	.571	.429	.142	83.3	89.0	80.0	9.0
16	.445	.500	.365	.135	84.1	90.0	79.5	10.5
17	.421	.482	.361	.121	81.9	86.5	80.0	6.5
18	.514	.594	.448	.146	79.6	83.3	78.0	5.3
19	.560	.613	.497	.116	82.5	86.0	78.7	7.3
20	.574	.618	.520	.098	84.9	89.5	81.2	8.3
21	.571	.620	.495	.125	86.7	94.4	81.2	13.2
22	.525	.583	.448	.135	86.0	93.6	81.8	11.8
23	.458	.512	.383	.129	85.1	91.9	81.5	10.4
24	.429	.475	.385	.090	82.3	87.5	79.4	8.1
25	.366	.426	.298	.128	83.9	89.5	80.0	9.5
26	.337	.395	.287	.108	83.9	90.7	81.4	9.3
27	.431	.513	.360	.153	81.0	83.5	79.5	4.0
28	.560	.636	.490	.146	83.6	90.0	79.5	10.5
29	.623	.687	.570	.117	82.1	90.3	78.0	12.3
30	.661	.718	.597	.121	83.5	89.5	80.2	9.3

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.







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Date.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.739	29.804	29.680	0.124	87.8	97.0	80.5	16.5
2	.802	.860	.745	.115	86.6	95.3	81.2	14.1
3	.826	.875	.764	.111	85.2	96.7	80.5	16.2
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6	.733	.769	.661	.108	81.2	88.3	79.0	9.3
7	.727	.793	.660	.133	82.5	88.0	79.0	9.0
8	.706	.766	.631	.135	81.8	87.6	77.0	10.6
9	.691	.745	.615	.130	82.5	90.2	78.0	12.2
10	.641	.689	.577	.112	80.7	88.0	77.0	11.0
11	.601	.645	.531	.114	83.7	91.9	79.0	12.9
12	.585	.635	.521	.114	85.8	93.4	80.3	13.1
13	.606	.652	.545	.107	86.9	93.0	81.5	11.5
14	.585	.636	.506	.130	85.4	94.8	82.0	12.8
15	.500	.571	.429	.142	83.3	89.0	80.0	9.0
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Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.739	29.804	29.680	0.124	87.8	97.0	80.5	16.5
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5	.742	.812	.647	.165	84.2	90.1	79.4	10.7
6	.733	.769	.661	.108	81.2	88.3	79.0	9.3
7	.727	.793	.660	.133	82.5	88.0	79.0	9.0
8	.706	.766	.631	.135	81.8	87.6	77.0	10.6
9	.691	.745	.615	.130	82.5	90.2	78.0	12.2
10	.641	.689	.577	.112	80.7	88.0	77.0	11.0
11	.601	.645	.531	.114	83.7	91.9	79.0	12.9
12	.585	.635	.521	.114	85.8	93.4	80.3	13.1
13	.606	.652	.545	.107	86.9	93.0	81.5	11.5
14	.585	.636	.506	.130	85.4	94.8	82.0	12.8
15	.500	.571	.429	.142	83.3	89.0	80.0	9.0
16	.445	.500	.365	.135	84.1	90.0	79.5	10.5
17	.421	.482	.361	.121	81.9	86.5	80.0	6.5
18	.514	.594	.448	.146	79.6	83.3	78.0	5.3
19	.560	.613	.497	.116	82.5	86.0	78.7	7.3
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22	.525	.583	.448	.135	86.0	93.6	81.8	11.8
23	.458	.512	.383	.129	85.1	91.9	81.5	10.4
24	.429	.475	.385	.090	82.3	87.5	79.4	8.1
25	.366	.426	.298	.128	83.9	89.5	80.0	9.5
26	.337	.395	.287	.108	83.9	90.7	81.4	9.3
27	.431	.513	.360	.153	81.0	83.5	79.5	4.0
28	.560	.636	.490	.146	83.6	90.0	79.5	10.5
29	.623	.687	.570	.117	82.1	90.3	78.0	12.3
30	.661	.718	.597	.121	83.5	89.5	80.2	9.3

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	80.0	7.8	75.3	12.5	0.862	9.16	4.44	0.67
2	80.6	6.0	77.0	9.6	.910	.69	3.45	.74
3	79.5	5.7	75.5	9.7	.868	.27	.34	.74
4	79.0	2.9	77.0	4.9	.910	.79	1.65	.86
5	79.6	4.6	76.4	7.8	.893	.56	2.68	.78
6	78.8	2.4	77.1	4.1	.913	.84	1.37	.88
7	79.5	3.0	77.4	5.1	.922	.91	.73	.85
8	78.4	3.4	76.0	5.8	.882	.48	.92	.83
9	78.2	4.3	75.2	7.3	.860	.24	2.40	.79
10	78.3	2.4	76.6	4.1	.899	.69	1.35	.88
11	80.0	3.7	77.4	6.3	.922	.89	2.18	.82
12	81.0	4.8	77.6	8.2	.928	.91	.92	.77
13	81.4	5.5	78.1	8.8	.913	10.04	3.21	.76
14	81.1	4.3	78.1	7.3	.943	.08	2.60	.80
15	80.1	3.2	77.9	5.4	.937	.06	1.87	.84
16	80.6	3.5	78.1	6.0	.943	.10	2.11	.83
17	79.9	2.0	78.5	3.4	.955	.29	1.15	.90
18	78.3	1.3	77.4	2.2	.922	9.97	0.72	.93
19	80.4	2.1	78.9	3.6	.967	10.39	1.25	.89
20	81.7	3.2	79.5	5.4	.986	.55	.94	.85
21	81.7	5.0	78.7	8.0	.961	.24	2.94	.78
22	81.8	4.2	78.9	7.1	.967	.32	.59	.80
23	81.5	3.6	79.0	6.1	.970	.37	.20	.83
24	80.5	1.8	79.2	3.1	.976	.50	1.08	.91
25	80.6	3.3	78.3	5.6	.949	.16	.97	.84
26	81.1	2.8	79.1	4.8	.973	.42	.71	.86
27	78.4	2.6	76.6	4.4	.899	9.69	.45	.87
28	79.7	3.9	77.0	6.6	.910	.75	2.28	.81
29	79.2	2.9	77.2	4.9	.961	.85	1.66	.86
30	80.1	3.4	77.7	5.8	.931	.98	2.02	.83

All the Hygrometrical elements are computed by the Greenwich Constants.



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taken at the Surveyor General's Office, Calcutta,  
in the month of June 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid- night.	29.610	29.836	29.355	0.481	81.4	84.5	78.5	6.0
1	.598	.834	.350	.484	81.2	84.5	78.0	6.5
2	.587	.831	.339	.492	80.9	84.0	77.6	6.4
3	.577	.827	.333	.494	80.6	83.5	77.2	6.3
4	.571	.829	.321	.508	80.4	83.0	77.0	6.0
5	.583	.841	.329	.512	80.2	82.8	77.0	5.8
6	.589	.842	.337	.505	80.4	82.5	77.3	5.2
7	.616	.849	.357	.492	81.4	84.8	78.0	6.8
8	.630	.861	.354	.507	83.3	86.5	79.0	7.5
9	.637	.874	.355	.519	85.1	89.0	79.5	9.5
10	.633	.875	.349	.526	87.1	92.0	80.0	12.0
11	.626	.865	.345	.520	87.3	93.7	80.2	13.5
Noon.	.611	.841	.329	.512	87.4	95.5	80.0	15.5
1	.588	.822	.309	.513	87.9	96.7	79.0	17.7
2	.570	.809	.300	.509	87.8	97.0	79.7	17.3
3	.550	.820	.295	.525	86.6	94.7	80.0	14.7
4	.535	.764	.287	.477	86.0	95.0	79.4	15.6
5	.532	.766	.287	.479	85.7	94.4	79.5	14.9
6	.542	.776	.305	.471	85.0	92.0	79.5	12.5
7	.562	.795	.331	.464	83.7	90.0	79.0	11.0
8	.587	.813	.349	.464	83.1	88.0	79.0	9.0
9	.606	.830	.365	.465	82.5	86.0	79.0	7.0
10	.621	.848	.378	.470	82.0	85.5	79.0	6.5
11	.621	.847	.370	.477	81.6	85.0	78.0	7.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	79.5	1.9	78.2	3.2	0.946	10.19	1.08	0.90
1	79.3	1.9	78.0	3.0	.940	.13	.08	.90
2	79.2	1.7	78.0	2.9	.940	.13	0.97	.91
3	79.0	1.6	77.9	2.9	.937	.10	.91	.92
4	78.9	1.5	77.8	2.6	.934	.07	.87	.92
5	78.9	1.3	78.0	2.2	.940	.15	.73	.93
6	79.1	1.3	78.2	2.2	.946	.21	.73	.93
7	79.6	1.8	78.3	3.1	.949	.22	1.05	.91
8	80.4	2.9	78.4	4.9	.952	.21	.72	.86
9	80.8	4.3	77.8	7.3	.934	9.99	2.58	.80
10	81.2	5.9	77.7	9.4	.931	.92	3.41	.74
11	80.8	6.5	76.9	10.4	.908	.66	.75	.72
Noon.	80.8	6.6	76.8	10.6	.905	.61	.84	.71
1	81.2	6.7	77.2	10.7	.916	.73	.91	.71
2	80.9	6.9	76.8	11.0	.905	.61	.99	.71
3	80.7	5.9	77.2	9.4	.916	.77	.37	.74
4	80.6	5.4	76.8	9.2	.905	.65	.26	.75
5	80.6	5.1	77.0	8.7	.910	.71	.09	.76
6	80.3	4.7	77.0	8.0	.910	.73	2.80	.78
7	79.9	3.8	77.2	6.5	.916	.81	.26	.81
8	79.8	3.3	77.5	5.6	.925	.92	1.94	.84
9	79.8	2.7	77.9	4.6	.937	10.06	.58	.86
10	79.7	2.3	78.1	3.9	.943	.14	.33	.88
11	79.6	2.0	78.2	3.4	.946	.19	.15	.90

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Mile.	
1	148.0	...	S S E & S	...	175.0	∩i to 7 A. M., ∩i to 4 P. M., ∩i to 7 P. M. B to 9 P. M., ∩i to 11 P. M.
2	148.8	0.02	S	1.6	190.8	∩i to 1 A. M. B to 5 A. M., ∩i to 2 P. M. O to 6 P. M., ∩i to 11 P. M. Brisk wind between 2 & 2½ P. M. T from 1½ to 3 P. M. Sheet L on N at 8 & 9 P. M. Light R at 3 P. M.
3	148.6	0.27	S by E & S E	6.0	100.7	S to 4 A. M., clouds of different kinds to 2 P. M. O to 9 P. M. S to 11 P. M. High wind from 2½ to 3 P. M. T between 2 & 3 P. M. L at midnight & 3 P. M. R between 3 & 4 P. M.
4	...	0.02	S E & S S E	...	78.0	S to 2 A. M. O to 6 A. M., ∩i to 10 A. M. O to 3 P. M. S to 7 P. M., ∩i to 11 P. M. T from 10 to 12 A. M. Light R after intervals from 11 A. M. to 3 P. M.
5	143.6	0.08	S S E & S S W	...	57.4	∩i to 4 A. M., ∩i to 12 A. M., ∩i & ∩i to 8 P. M., ∩i to 11 P. M. T at 11½ A. M. & 2½ P. M. Light R between 11 & 12 A. M.
6	141.0	1.17	S by E & S S E	1.0	105.1	B to 5 A. M., ∩i to 7 A. M., ∩i to 10 A. M. O to 8 P. M. B to 11 P. M. Sheet L at 11½ P. M. T & R from 10½ A. M. to 2 P. M.
7	138.0	0.06	SSW, SE & S by E	...	110.9	∩i to 1 A. M. O to 4 A. M., ∩i to 12 A. M. S to 11 P. M. Sheet L at midnight Light R at 1½ & 5½ A. M.
8	137.0	0.08	SE, S by E & SSW	...	198.9	∩i & ∩i to 2 A. M. O to 9 A. M. ∩i to 11 A. M. S to 1 P. M., ∩i to 7 P. M. B to 11 P. M. Sheet L at 7½ P. M. Light R at 3 & 4½ A. M.
9	144.0	0.12	S by W & S W	2.9	154.6	Clouds of various kinds. Sheet L on S between 1 & 2 A. M., & 10 & 11 P. M. R at 7 P. M.

∩i Cirri, —i Strati, ∩i Cumuli, ∩i Cirro-strati, ∩i Cumulo-strati, ∩i Nimbi, ∩i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning, R rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	°	Inches		lb	Miles.	
10	132.0	1.47	S, SSE & S by E	0.4	175.4	S to 3 A. M. O to 7 A. M., \i to 9 A. M., \i to 11 A. M. O to 3 P. M. S to 7 P. M., \i & \i to 11 P. M. T at 12 A. M. R at 6½, from 10½ to 12 A. M. & at 7½ P. M.
11	143.4	...	S by E, S & W S W	...	161.7	B to 3 A. M. O to 5 A. M., \i to 1 P. M. O to 4 P. M. S to 7 P. M. B to 11 P. M. Sheet L at 8 & 9 P. M.
12	145.3	0.05	W by S & S S W	...	180.1	S to 7 A. M., \i & \i to 4 P. M. S to 6 P. M., \i to 9 P. M. B to 11 P. M. T at 6 A. M. Sheet L on W from 7½ to 10 p. m. Light R between 1 & 2 A. M.
13	143.5	...	S by W	...	129.2	B to 4 A. M., \i & \i to 5 P. M. \i to 11 P. M. Sheet L on W S W at 9 P. M.
14	145.2	0.58	S by W & S E	2.8	140.1	B 4 A. M., \i to 7 A. M., \i to 1 P. M. O to 4 P. M., \i to 7 P. M. B to 11 P. M. Sheet L at Midnight. T between 1 & 2 P. M. R between 1½ & 2½ P. M.
15	136.2	0.03	S E & E by S	2.0	173.6	B to 4 A. M., \i & \i to 12 A. M., \i to 3 P. M. O to 8 P. M. \i to 11 P. M. Sheet L on W at 11 P. M. Light R at 1, 4½ & 6 P. M.
16	141.0	0.14	E & E by N	1.6	223.8	B to 5 A. M., \i to 6 P. M. O to 11 P. M. Sheet L on S at 11 P. M. Slight R between 10 & 11 A. M. & at 7½ P. M.
17	...	0.61	E by N, ESE & SE	4.4	296.2	S to 2 A. M. O to 7 A. M., \i to 10 A. M. O to 6 P. M. S to 11 P. M. Sheet L on N W at 9 P. M. R after intervals.
18	124.5	0.26	S S E & S E	...	264.3	Chiefly O. Slight R after in-
19	...	0.06	S S E & S	0.3	148.3	S to 4 A. M., \i to 10 A. M. O to 4 P. M. S to 7 P. M., \i to 11 P. M. Sheet L at 1 A. M. 8 & 10 P. M. Light R at 1½ 10½ & 12 A. M.

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning R. rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1874.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		ft	Miles.	
20	136.0	...	S S E & S	...	161.8	B to 3 A. M., Clouds of different kinds to 9 A. M. S to 2 P. M., \i & \i to 7 P. M. B to 11 P. M. Sheet L on S W at midnight.
21	147.0	...	S by E & S	...	170.6	B to 2 A. M., \i & \i to 10 A. M., \i to 8 P. M. B to 11 P. M. \i to 9 A. M., \i to 2 P. M. O to 4 P. M., \i to 11 P. M. Sheet L on W at midnight.
22	148.0	...	S by E & S	...	155.9	B to 5 A. M., \i to 11 A. M., \i to 7 P. M. O to 11 P. M. T & L at 8 P. M. Slight R between 11 & 12 A. M. & 8 & 9 P. M.
23	146.2	0.18	S, S S E & S S W	...	150.7	O to 7 P. M. S to 11 P. M. Slight R between Midnight & 1 A. M. & from 2 to 7 P. M.
24	133.0	0.21	S by E & variable	...	104.6	O to 8 A. M., \i to 5 P. M. S to 11 P. M. Slight R at 4½ A. M.
25	139.2	0.09	S by W & S S W & S	...	126.9	O to 9 A. M., \i to 2 P. M. S to 11 P. M. D at 2½, 4, 8½, 9 & 11 P. M.
26	149.2	...	S by W, S & S W	...	128.4	O to 4 P. M., \i to 11 P. M. Light R at 7, 9 & 11 A. M. 2, 3½ & 4 P. M.
27	111.7	0.08	S, S W & S S W	2.0	165.6	O to 10 A. M., \i to 3 P. M. O to 11 P. M. Light R at 9½ A. M. 5, 6½ and 9 P. M.
28	147.0	0.03	S S W & S	0.3	177.7	O to 8 A. M. \i to 3 P. M. O to 7 P. M. \i to 11 P. M. T between midnight & 1 A. M. & 4 & 5 P. M.
29	144.7	1.28	S S E & variable	...	121.3	L between midnight & 1 A. M. and at 9 P. M. R after intervals.
30	143.5	...	S by E	...	127.0	\i and \i to 10 A. M., \i & S to 11 P. M. T between 2 and 4 P. M. D at 8 A. M. 2½ and 3½ P. M.

\i Cirri —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati \i Nimbi, \i Cirro-Cumuli, B clear, S stratoni, O overcast, T thunder, L lightning R rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1874.*

## MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.591
Max. height of the Barometer occurred at 10 A. M. on the 3rd ...	29.875
Min. height of the Barometer occurred at 4 & 5 P. M. on the 26th ...	29.287
Extreme range of the Barometer during the month ...	0.588
Mean of the daily Max. Pressures ... ..	29.649
Ditto ditto Min. ditto ... ..	29.524
Mean daily range of the Barometer during the month ...	0.125

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	°
Mean Dry Bulb Thermometer for the month ... ..	83.7
Max. Temperature occurred at 2 P. M. on the 1st ...	97.0
Min. Temperature occurred at 4 & 5 A. M. on the 8th & 10th ...	77.0
Extreme range of the Temperature during the month ...	20.0
Mean of the daily Max. Temperature ... ..	90.2
Ditto ditto Min. ditto, ... ..	79.8
Mean daily range of the Temperature during the month ...	10.4

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Mean Wet Bulb Thermometer for the month ... ..	80.0
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	3.7
Computed Mean Dew-point for the month ... ..	77.4
Mean Dry Bulb Thermometer above computed mean Dew-point ...	6.3

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	Inches.
Mean Elastic force of Vapour for the month ... ..	0.922

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	Troy grain.
Mean Weight of Vapour for the month ... ..	9.89
Additional Weight of Vapour required for complete saturation ...	2.18
Mean degree of humidity for the month, complete saturation being unity	0.82

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	°
Mean Max. Solar radiation Thermometer for the month ... ..	140.9

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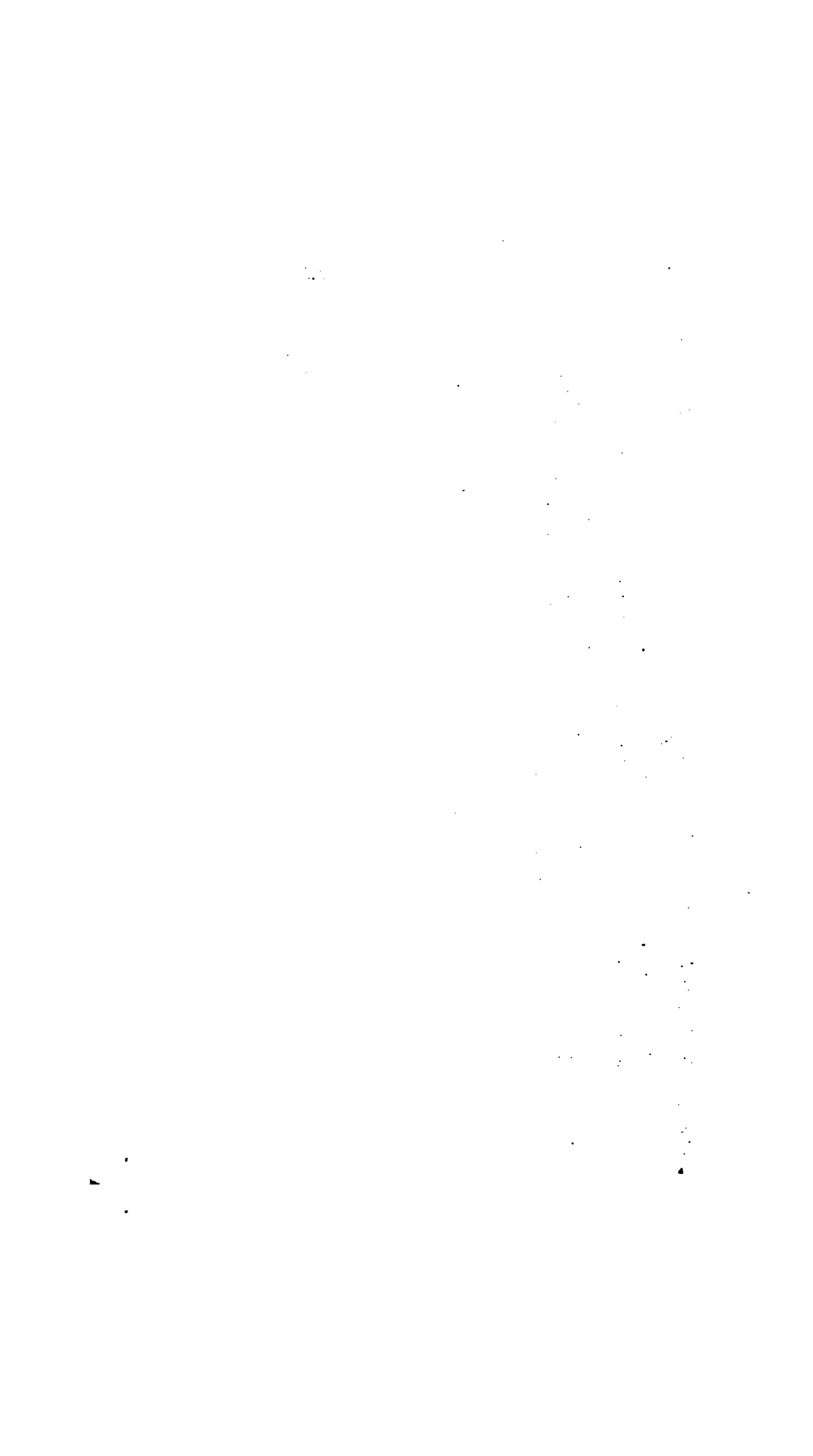
	Inches.
Rained 24 days,—Max. fall of rain during 24 hours ... ..	1.47
Total amount of rain during the month ... ..	6.89
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	6.08
Prevailing direction of the Wind ... .. S., S. S. E. & S. by E.	

\* Height 70 feet 10 inches above ground.











# Meteorological Observations.

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*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1874.*

Latitude 22° 33' 17" North. Longitude 88° 20' 34" East.

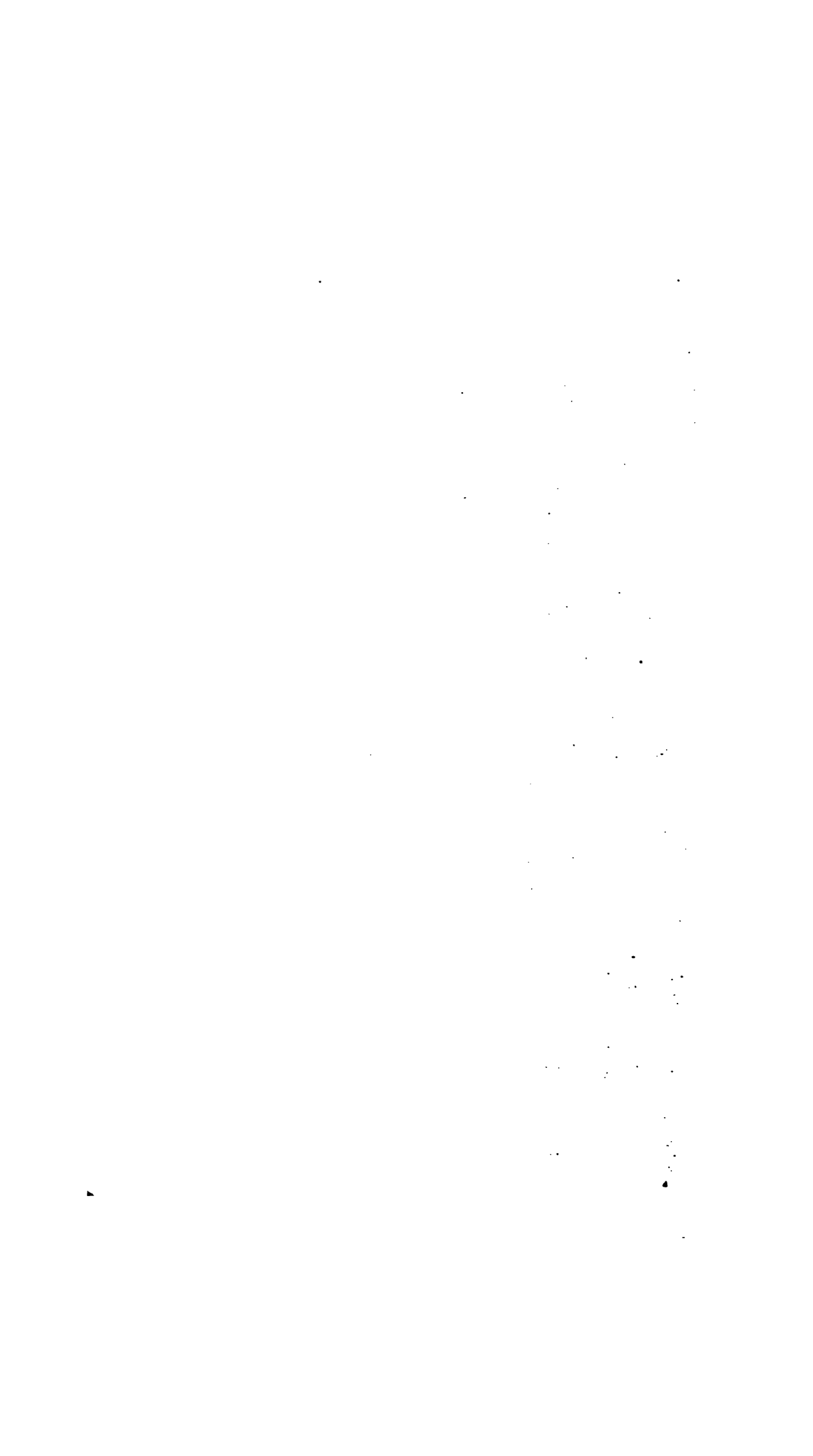
Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.685	29.733	29.621	0.112	83.8	90.0	80.0	10.0
2	.677	.732	.601	.131	84.9	92.0	80.0	12.0
3	.657	.712	.574	.138	83.6	88.4	80.0	8.4
4	.601	.658	.528	.130	84.2	91.0	79.6	11.4
5	.586	.622	.541	.081	84.1	87.8	81.0	6.8
6	.563	.600	.501	.099	84.1	87.5	81.2	6.3
7	.583	.641	.541	.100	85.7	92.3	80.5	11.8
8	.622	.679	.567	.112	85.3	91.5	80.5	11.0
9	.596	.643	.544	.099	85.2	93.4	80.2	13.2
10	.580	.630	.514	.116	84.2	90.3	81.0	9.3
11	.597	.645	.534	.111	83.8	90.0	81.0	9.0
12	.644	.718	.589	.129	83.1	87.3	79.9	7.4
13	.684	.739	.624	.115	83.5	89.0	79.5	9.5
14	.645	.684	.593	.091	84.2	89.3	80.0	9.3
15	.637	.684	.573	.111	84.1	88.8	81.6	7.2
16	.665	.728	.586	.142	83.3	87.4	79.7	7.7
17	.681	.728	.611	.117	85.1	92.0	79.5	12.5
18	.681	.722	.613	.109	87.0	93.8	81.0	12.8
19	.670	.737	.586	.151	87.2	92.8	81.8	11.0
20	.631	.692	.547	.145	86.7	94.2	82.0	12.2
21	.582	.641	.484	.157	86.7	94.0	82.5	11.5
22	.537	.583	.468	.115	85.8	91.2	82.2	9.0
23	.508	.551	.441	.110	83.6	88.6	80.5	7.8
24	.489	.562	.429	.133	82.6	87.5	79.8	7.7
25	.541	.599	.512	.087	81.2	87.4	79.5	7.9
26	.564	.616	.510	.106	82.0	87.5	79.4	8.1
27	.533	.599	.452	.147	82.6	88.0	79.4	8.6
28	.405	.479	.339	.140	80.5	83.2	79.2	4.0
29	.419	.537	.351	.186	82.2	86.5	79.0	7.5
30	.519	.575	.452	.123	83.4	87.6	79.6	8.0
31	.481	.526	.435	.091	80.7	84.5	78.2	6.3

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.







# Meteorological Observations.

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*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1874.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.685	29.733	29.621	0.112	83.8	90.0	80.0	10.0
2	.677	.732	.601	.131	84.9	92.0	80.0	12.0
3	.657	.712	.574	.138	83.6	88.4	80.0	8.4
4	.601	.658	.528	.130	84.2	91.0	79.6	11.4
5	.586	.622	.541	.081	84.1	87.8	81.0	6.8
6	.563	.600	.501	.099	84.1	87.5	81.2	6.3
7	.588	.641	.541	.100	85.7	92.3	80.5	11.8
8	.622	.679	.567	.112	85.3	91.5	80.5	11.0
9	.596	.643	.544	.099	85.2	93.4	80.2	13.2
10	.580	.630	.514	.116	84.2	90.3	81.0	9.3
11	.597	.645	.534	.111	83.8	90.0	81.0	9.0
12	.614	.718	.589	.129	83.1	87.3	79.9	7.4
13	.684	.739	.624	.115	83.5	89.0	79.5	9.5
14	.645	.684	.593	.091	84.2	89.3	80.0	9.3
15	.637	.684	.573	.111	84.1	88.8	81.6	7.2
16	.665	.728	.586	.142	83.3	87.4	79.7	7.7
17	.681	.728	.611	.117	85.1	92.0	79.5	12.5
18	.681	.722	.613	.109	87.0	93.8	81.0	12.8
19	.670	.737	.586	.151	87.2	92.8	81.8	11.0
20	.631	.692	.547	.145	86.7	94.2	82.0	12.2
21	.582	.641	.484	.157	86.7	94.0	82.5	11.5
22	.537	.583	.468	.115	85.8	91.2	82.2	9.0
23	.508	.551	.441	.110	83.6	88.6	80.8	7.8
24	.489	.562	.429	.133	82.6	87.5	79.8	7.7
25	.541	.599	.512	.087	81.2	87.4	79.5	7.9
26	.564	.616	.510	.106	82.0	87.5	79.4	8.1
27	.533	.599	.452	.147	82.6	88.0	79.4	8.6
28	.405	.479	.339	.140	80.5	83.2	79.2	4.0
29	.419	.537	.351	.186	82.2	86.5	79.0	7.5
30	.519	.575	.452	.123	83.4	87.6	79.6	8.0
31	.481	.526	.435	.091	80.7	84.5	78.2	6.3

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	80.4	3.4	78.0	5.8	0.940	10.07	2.03	0.83
2	80.4	4.5	77.2	7.7	.916	9.79	.70	.78
3	79.9	3.7	77.3	6.3	.919	.86	.17	.82
4	80.4	3.8	77.7	6.5	.931	.96	.28	.81
5	80.7	3.4	78.3	5.8	.949	10.16	.05	.83
6	81.0	3.1	78.8	5.3	.964	.34	1.87	.85
7	80.8	4.9	77.4	8.3	.922	9.85	2.95	.77
8	81.0	4.3	78.0	7.3	.940	10.05	.59	.80
9	81.3	3.9	78.6	6.6	.958	.23	.38	.81
10	81.3	2.9	79.3	4.9	.979	.48	1.76	.86
11	80.6	3.2	78.4	5.4	.952	.21	.89	.84
12	80.0	3.1	77.8	5.3	.934	.03	.83	.85
13	79.9	3.6	77.4	6.1	.922	9.89	2.11	.82
14	80.4	3.8	77.7	6.5	.931	.96	.28	.81
15	80.8	3.3	78.5	5.6	.955	10.23	1.98	.84
16	80.2	3.1	78.0	5.3	.940	.09	.84	.85
17	80.8	4.3	77.8	7.3	.934	9.99	2.58	.80
18	81.0	6.0	77.4	9.6	.922	.81	3.48	.74
19	81.4	5.8	77.9	9.3	.937	.98	.39	.75
20	81.2	5.5	77.9	8.8	.937	.98	.20	.76
21	81.4	5.3	78.2	8.5	.946	10.07	.11	.76
22	81.5	4.3	78.5	7.3	.955	.21	2.62	.80
23	80.5	3.1	78.3	5.3	.949	.18	1.85	.85
24	80.3	2.3	78.7	3.9	.961	.33	.35	.88
25	79.8	1.4	78.8	2.4	.964	.40	0.81	.93
26	80.4	1.6	79.3	2.7	.979	.53	.94	.92
27	80.3	2.3	78.7	3.9	.961	.33	1.35	.88
28	79.3	1.2	78.5	2.0	.955	.31	0.67	.94
29	79.1	3.1	76.9	5.3	.908	9.76	1.78	.85
30	81.0	2.4	79.3	4.1	.979	10.51	.45	.88
31	.792	1.5	78.1	2.6	.943	.16	0.88	.92

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Falt.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid- night.	29.613	29.728	29.375	0.353	82.0	85.0	79.5	5.5
1	.603	.712	.361	.351	81.6	84.2	79.0	5.2
2	.592	.699	.355	.344	81.3	83.8	79.0	4.8
3	.580	.687	.351	.336	81.0	83.0	79.0	4.0
4	.572	.676	.357	.319	80.7	82.8	79.0	3.8
5	.583	.688	.366	.322	80.5	82.5	79.4	3.1
6	.597	.702	.386	.316	80.5	82.5	79.0	3.5
7	.612	.721	.385	.336	81.3	83.6	79.3	4.3
8	.625	.737	.401	.336	83.0	85.6	80.0	5.6
9	.632	.735	.431	.304	81.8	87.0	80.0	7.0
10	.630	.739	.434	.305	85.9	89.0	80.5	8.5
11	.619	.721	.427	.294	87.1	91.0	81.5	9.5
Noon.	.605	.715	.408	.307	87.9	92.3	83.0	9.3
1	.586	.688	.381	.307	87.7	93.4	79.5	13.9
2	.568	.678	.373	.305	87.8	93.5	79.4	14.1
3	.547	.655	.347	.308	87.5	94.0	78.2	15.8
4	.532	.631	.344	.287	87.5	94.2	79.0	15.2
5	.528	.624	.339	.285	86.8	93.5	79.0	14.5
6	.541	.629	.348	.281	85.7	92.5	79.1	13.4
7	.559	.665	.354	.311	84.4	89.7	78.6	11.1
8	.580	.688	.369	.319	83.6	88.5	78.5	10.0
9	.602	.706	.384	.322	83.1	87.4	78.8	8.6
10	.619	.725	.400	.325	82.6	86.0	78.5	7.5
11	.617	.728	.396	.332	82.1	85.5	78.5	7.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	80.0	2.0	78.6	3.4	0.958	10.32	1.15	0.90
1	79.8	1.8	78.5	3.1	.955	.29	.05	.91
2	79.6	1.7	78.4	2.9	.952	.25	0.99	.91
3	79.5	1.5	78.4	2.6	.952	.25	.89	.92
4	79.3	1.4	78.3	2.4	.949	.24	.80	.93
5	79.1	1.4	78.1	2.4	.943	.18	.80	.93
6	79.2	1.3	78.3	2.2	.949	.24	.74	.93
7	79.8	1.5	78.7	2.6	.961	.35	.89	.92
8	80.5	2.5	78.7	4.3	.961	.33	1.49	.87
9	81.0	3.8	78.3	6.5	.949	.14	2.32	.81
10	81.2	4.7	77.9	8.0	.937	.00	.87	.78
11	81.5	5.6	78.1	9.0	.943	.04	3.29	.75
Noon.	81.8	6.1	78.1	9.8	.943	.02	.62	.74
1	81.7	6.0	78.1	9.6	.943	.02	.54	.74
2	81.5	6.3	77.7	10.1	.931	9.90	.70	.73
3	81.2	6.3	77.4	10.1	.922	.81	.68	.73
4	81.4	6.1	77.7	9.8	.931	.90	.59	.73
5	81.2	5.6	77.8	9.0	.934	.95	.26	.75
6	81.0	4.7	77.7	8.0	.931	.94	2.86	.78
7	80.7	3.7	78.1	6.3	.943	10.10	.21	.82
8	80.6	3.0	78.5	5.1	.955	.25	1.78	.85
9	80.4	2.7	78.5	4.6	.955	.25	.61	.86
10	80.3	2.3	78.7	3.9	.961	.33	.35	.88
11	80.1	2.0	78.7	3.4	.961	.35	.16	.90

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<sup>o</sup>	Inches		lb	Mile.	
1	137.8	0.04	S by E & SSE	...	116.6	∩i to 8 A. M., ∩i to 1 P. M. O to 5 P. M. ∩i & ∩i to 11 P. M. T between 1 & 2 P. M. Light R at 12½ A. M. 1½ & 5 P. M.
2	151.0	0.08	S S E & S	...	84.4	∩i & ∩i to 6 A. M., ∩i to 7 P. M. B to 11 P. M. Slight R between 9 & 10 A. M.
3	134.0	0.21	S by E	...	152.3	B to 4 A. M., ∩i to 7 A. M., ∩i to 11 A. M., ∩i & ∩i to 11 P. M. Slight R at 9 & 12 A. M.
4	137.0	0.04	S by E, S S W & S	...	137.2	∩i & ∩i to 4 A. M., ∩i to 5 P. M., ∩i to 8 P. M. B to 11 P. M. Sheet L on W between 9 & 10 P. M. Light R at 7, 9½ & 10 A. M.
5	120.0	0.02	S & S S W	...	166.0	∩i to 6 A. M., ∩i to 11 A. M. O to 5 P. M. S to 8 P. M. B to 11 P. M. T at 10½ A. M. Sheet L on S W between 10 & 11 P. M. Light R at 7½, 9½, 10½ & 11 A. M.
6	128.5	...	S S W	0.6	223.4	∩i to 5 A. M. O to 7 A. M., ∩i to 11 A. M. S to 7 P. M. B to 11 P. M. Sheet L on S W from midnight to 2 A. M.
7	141.2	...	S S W	1.2	240.3	S to 2 A. M. ∩i to 8 A. M. ∩i & ∩i to 6 P. M. S to 11 P. M. Sheet L on N W between 7 & 8 P. M.
8	144.2	...	S S W & S	...	203.3	S to 9 A. M., ∩i & ∩i to 8 P. M. B to 11 P. M. Sheet L on S W at 8 & 9 P. M. D at 4 P. M.
9	150.0	...	S & S by E	...	131.4	B to 4 A. M., ∩i to 7 A. M., ∩i to 2 P. M. S to 6 P. M., ∩i to 9 P. M. B to 11 P. M. T at 1½, 2½ & 4 P. M.
10	142.0	0.31	S by E & S	2.8	155.0	B to 3 A. M., ∩i to 9 A. M. O to 12 A. M., ∩i to 2 P. M. S to 8 P. M. B to 11 P. M. T at 10 A. M. & 2 P. M. Sheet L on N W from 7½ to 10 P. M. R at 9½ A. M. & 3 P. M.

∩i Cirri,—i Strati, ∩i Cumuli, ∩i Cirro-strati, ∩i Cumulo-strati, ∩i Nimbi,  
∩i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning,  
R. rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	80.0	2.0	78.6	3.4	0.958	10.32	1.15	0.90
1	79.8	1.8	78.5	3.1	.955	.29	.05	.91
2	79.6	1.7	78.4	2.9	.952	.25	0.99	.91
3	79.5	1.5	78.4	2.6	.952	.25	.89	.92
4	79.3	1.4	78.3	2.4	.949	.24	.80	.93
5	79.1	1.4	78.1	2.4	.943	.18	.80	.93
6	79.2	1.3	78.3	2.2	.949	.24	.74	.93
7	79.8	1.5	78.7	2.6	.961	.35	.89	.92
8	80.5	2.5	78.7	4.3	.961	.33	1.49	.87
9	81.0	3.8	78.3	6.5	.949	.14	2.32	.81
10	81.2	4.7	77.9	8.0	.937	.00	.87	.78
11	81.5	5.6	78.1	9.0	.943	.04	3.29	.75
Noon.	81.8	6.1	78.1	9.8	.943	.02	.62	.74
1	81.7	6.0	78.1	9.6	.943	.02	.54	.74
2	81.5	6.3	77.7	10.1	.931	9.90	.70	.73
3	81.2	6.3	77.4	10.1	.922	.81	.68	.73
4	81.4	6.1	77.7	9.8	.931	.90	.59	.73
5	81.2	5.6	77.8	9.0	.934	.95	.26	.75
6	81.0	4.7	77.7	8.0	.931	.94	2.86	.78
7	80.7	3.7	78.1	6.3	.943	10.10	.21	.82
8	80.6	3.0	78.5	5.1	.955	.25	1.78	.85
9	80.4	2.7	78.5	4.6	.955	.25	.61	.86
10	80.3	2.3	78.7	3.9	.961	.33	.35	.88
11	80.1	2.0	78.7	3.4	.961	.35	.16	.90

All the Hygrometrical elements are computed by the Greenwich Constants.







*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
11	141.8	0.36	Sby E & S S E	2.8	160.8	B to 3 A. M., \i to 6 A. M., \i & \i to 2 P. M., \i & \i to 7 P. M. B to 11 P. M. Rat 12 A. M. 2 & 2½ P. M.
12	142.0	0.05	S S E & S E	1.9	170.9	B to 4 A. M. S to 3 P. M., \i & \i to 8 P. M. B to 11 P. M. Sheet L on N W at 8 P. M. Light R at 11½, 12½ A. M., 1½ & 4½ P. M.
13	138.8	0.02	S E, S & S by W	0.6	170.6	B to 3 A. M., \i to 5 P. M., \i to 8 P. M. B to 11 P. M. Light R at 6½, 9 & 10 A. M.
14	129.5	...	S, S S W & S by W	0.4	189.0	B to 2 A. M., \i to 8 A. M. \i to 1 P. M. S to 9 P. M. B to 11 P. M.
15	118.8	0.03	S by W & S	...	165.2	\i & \i to 3 A. M., \i to 8 A. M. O to 1 P. M. S to 4 P. M. O to 11 P. M. Sheet L on S at 11 P. M. Light Rat 10½, 12 A. M. & 6½ P. M.
16	142.7	0.48	S by E & S by W	0.8	140.2	O to 6 A. M., \i to 2 P. M. S to 11 P. M. T at 8½ P. M. Sheet L from 7 to 10 P. M. R between Midnight & 1, 9 & 10 A. M. at 1 & between 7 & 8 P. M.
17	145.0	...	S by W, S & S S W	...	89.0	\i & \i to 7 A. M., \i to 8 P. M. \i to 11 P. M. T at 4½ & 5 P. M. Sheet L at 7½, 10 & 11 P. M. D at 5½ P. M.
18	145.0	...	S S W & S E	...	77.6	S to 4 A. M., \i & \i to 11 P. M.
19	142.0	...	Sby E, Sby W & S E	...	89.7	\i to 11 A. M., \i to 9 P. M. B to 11 P. M. Sheet L at Midnight & at 1 A. M.
20	143.2	...	S by E	...	80.4	B to 3 A. M., \i & \i to 10 A. M., \i & \i to 7 P. M. B to 11 P. M. D at 12½ A. M.
21	147.0	0.92	Sby E, S E & E S E	1.0	80.7	B to 6 A. M., \i to 7 P. M. \i to 9 P. M., \i to 11 P. M. T at 5½ P. M. R from 5 to 6½ P. M.
22	144.2	...	E S E & S E	...	89.1	\i to 1 A. M. S to 6 A. M. \i to 10 A. M., \i to 1 P. M. \i to 11 P. M.

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning R. rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1874.*

Solar Radiation, Weather, &c..

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches.		lb	Miles.	
23	134.0	0.12	S E, E N E & E	2.0	183.1	B to 4 A. M., \i to 7 A. M., \i to 3 P. M., \i to 11 P. M. T at 1½ & 3 P. M. Light R at 1, 2, 3½, 7 & 9 P. M.
24	137.5	0.27	E & S E	1.2	240.1	Chiefly O. T & L at 11½ P. M. Slight R at 3, 6½, 7½, 9 A. M. 1½, 2 & 7½ P. M.
25	128.4	1.02	E S E & S E	1.0	180.3	O to 3 A. M., \i to 7 A. M., \i to 10 A. M. O to 11 P. M. T from 11 A. M. to 1½ P. M. R after intervals.
26	127.0	0.19	E S E, E & E by S	1.2	137.7	O to 5 A. M., \i to 12 A. M. S to 11 P. M. T at 12½ A. M. Sheet L on N at 8 P. M. Slightly foggy at 10 P. M. Slight R at 1, 3, 4 A. M. & from 1 to 5½ P. M.
27	139.5	0.61	E by S, E & E by N	1.0	98.6	S to 3 A. M., \i 12 A. M. O to 11 P. M. T from 12½ A. M., to 1½ P. M. L at 12½ A. M. R from 11 A. M. to 1 P. M.
28	...	0.45	E by N, N E & E S E	3.6	269.3	\i to 2 A. M. S to 6 A. M. O to 11 P. M. Brisk wind from 7 A. M. to 4 P. M. Slight R from 7 A. M. to 10½ P. M.
29	121.5	0.27	S E, S by E & S	3.0	382.4	O to 11 A. M., clouds of different kinds to 11 P. M. Brisk wind from 8½ A. M. to 3½ P. M. Slight R from 1 to 9 A. M. & at 11 P. M.
30	117.5	0.03	S & S by E	...	219.3	B to 2 a. m., \i to 6 a. m. S to 4 p. m. O to 8 p. m., \i to 11 p. m. Light R at 3½ & 6 p. m.
31	124.3	3.37	S by E, S W & S by [W	0.5	127.7	\i to 9 a. m. O to 8 p. m., \i to 11 p. m. T at 12 a. m. & 2½ p. m. Slightly foggy at 10 & 11 p. m. R from 11½ a. m. to 5 p. m.

\i Cirri —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati \i Nimbi,  
\i Cirro-Cumuli, B clear, S straton, O overcast, T thunder, L lightning  
R rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1874.*

## MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.589
Max. height of the Barometer occurred at 10 A. M. on the 13th ...	29.739
Min. height of the Barometer occurred at 5 P. M. on the 28th ...	29.339
Extreme range of the Barometer during the month ...	0.400
Mean of the daily Max. Pressures ... ..	29.645
Ditto ditto Min. ditto ... ..	29.525
Mean daily range of the Barometer during the month ...	0.120

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	°
Mean Dry Bulb Thermometer for the month ... ..	84.0
Max. Temperature occurred at 4 P. M. on the 20th ...	94.2
Min. Temperature occurred at 3 P. M. on the 31st ...	78.2
Extreme range of the Temperature during the month ...	16.0
Mean of the daily Max. Temperature ... ..	89.5
Ditto ditto Min. ditto, ... ..	80.3
Mean daily range of the Temperature during the month ...	9.2

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Mean Wet Bulb Thermometer for the month ... ..	80.5
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	3.5
Computed Mean Dew-point for the month ... ..	78.0
Mean Dry Bulb Thermometer above computed mean Dew-point ...	6.0

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.940

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	Troy grain.
Mean Weight of Vapour for the month ... ..	10.07
Additional Weight of Vapour required for complete saturation ...	2.10
Mean degree of humidity for the month, complete saturation being unity	0.83

	°
Mean Max. Solar radiation Thermometer for the month ... ..	136.5

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	Inches.
Rained 24 days,—Max. fall of rain during 24 hours ... ..	3.37
Total amount of rain during the month ... ..	8.89
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	7.79
Prevailing direction of the Wind ... .. S. by E. & S.	

\* Height 70 feet 10 inches above ground.











# Meteorological Observations.

lx

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1874.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.439	29.499	29.365	0.134	81.9	86.5	78.0	8.5
2	.425	.511	.317	.164	82.0	87.4	78.9	8.5
3	.585	.679	.496	.183	82.7	88.5	79.0	9.5
4	.640	.677	.554	.123	79.8	82.0	78.5	3.5
5	.628	.671	.557	.114	82.1	88.0	78.0	10.0
6	.653	.702	.597	.105	82.6	86.8	80.0	6.8
7	.669	.714	.612	.102	83.6	90.0	79.5	10.5
8	.624	.687	.546	.141	85.1	92.0	80.5	11.5
9	.561	.605	.507	.098	81.4	90.8	81.5	9.3
10	.580	.627	.518	.109	81.8	86.2	77.8	8.4
11	.572	.630	.501	.129	83.0	88.2	79.0	9.2
12	.571	.625	.518	.107	83.6	88.8	80.0	8.8
13	.583	.631	.505	.126	82.7	87.2	80.2	7.0
14	.572	.613	.507	.106	82.9	88.3	79.8	8.5
15	.584	.628	.542	.086	82.1	86.0	79.0	7.0
16	.604	.656	.561	.095	81.6	86.8	78.0	8.8
17	.629	.686	.571	.115	83.2	88.8	79.5	9.3
18	.576	.657	.497	.160	84.4	90.5	80.0	10.5
19	.553	.594	.496	.098	81.6	91.0	80.5	10.5
20	.561	.604	.489	.115	83.8	88.3	80.0	8.3
21	.547	.589	.492	.097	83.4	91.5	81.0	10.5
22	.513	.559	.413	.116	81.0	81.5	80.2	1.3
23	.559	.605	.514	.091	81.2	87.0	77.5	9.5
24	.567	.623	.508	.115	83.8	89.0	79.5	9.5
25	.498	.547	.433	.114	83.8	87.8	81.5	6.3
26	.454	.496	.387	.109	82.6	86.5	79.8	6.7
27	.549	.612	.473	.169	80.6	84.4	78.0	6.4
28	.690	.763	.614	.149	81.4	87.0	77.8	9.2
29	.764	.818	.708	.110	83.7	89.0	79.3	9.7
30	.743	.802	.664	.138	85.1	91.0	80.0	11.0
31	.706	.770	.620	.150	85.7	92.5	81.5	11.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	79.1	2.8	77.1	4.8	0.913	9.82	1.62	0.86
2	79.5	2.5	77.7	4.3	.931	10.02	.45	.87
3	80.5	2.2	79.0	3.7	.970	.42	.30	.89
4	78.9	0.9	78.3	1.5	.949	.24	0.51	.95
5	79.9	2.2	78.4	3.7	.952	.23	1.28	.89
6	80.6	2.0	79.2	3.4	.976	.50	.18	.90
7	80.6	3.0	78.5	5.1	.955	.25	.78	.85
8	81.2	3.9	78.5	0.6	.955	.21	2.36	.81
9	81.4	3.0	79.3	5.1	.979	.48	1.83	.85
10	79.8	2.0	78.4	3.4	.952	.25	.15	.90
11	80.0	3.0	77.9	5.1	.937	.06	.76	.85
12	80.6	3.0	78.5	5.1	.955	.25	.78	.85
13	80.1	2.6	78.3	4.4	.949	.20	.52	.87
14	80.1	2.8	78.1	4.8	.943	.12	.67	.86
15	79.8	2.3	78.2	3.9	.946	.17	.34	.88
16	79.4	2.2	77.9	3.7	.937	.08	.26	.89
17	80.4	2.8	78.4	4.8	.952	.21	.68	.86
18	80.9	3.5	78.4	6.0	.952	.19	2.12	.83
19	81.1	3.5	78.6	6.0	.958	.26	.13	.83
20	81.1	2.7	79.2	4.6	.976	.45	1.65	.86
21	80.9	2.5	79.1	4.3	.973	.45	.51	.87
22	79.9	1.1	79.1	1.9	.973	.49	0.65	.94
23	79.1	2.1	77.6	3.6	.928	9.99	1.22	.89
24	80.2	3.6	77.7	6.1	.931	.98	2.12	.83
25	80.6	3.2	78.4	5.4	.952	10.21	1.89	.84
26	80.5	2.1	79.0	3.6	.970	.42	.26	.89
27	78.2	2.4	76.5	4.1	.896	9.67	.34	.88
28	79.0	2.4	77.3	4.1	.919	.90	.37	.88
29	80.0	3.7	77.4	6.3	.922	.89	2.18	.82
30	80.7	4.4	77.6	7.5	.928	.91	.66	.79
31	80.9	4.8	77.5	8.2	.925	.88	.92	.77

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.608	29.776	29.452	0.324	81.0	83.0	78.0	5.0
1	.596	.768	.428	.340	80.8	83.5	78.0	5.5
2	.584	.753	.413	.340	80.5	82.5	77.5	5.0
3	.573	.752	.402	.350	80.2	82.0	77.5	4.5
4	.567	.751	.389	.362	80.0	81.8	77.5	4.3
5	.576	.753	.405	.348	79.8	81.6	77.8	3.8
6	.588	.767	.426	.341	79.8	81.6	77.8	3.8
7	.604	.791	.450	.341	80.6	82.5	78.0	4.5
8	.621	.808	.451	.357	81.9	84.5	78.0	6.5
9	.629	.806	.460	.346	83.3	86.2	78.2	8.0
10	.628	.818	.454	.364	84.9	88.5	79.6	8.9
11	.622	.812	.446	.366	85.7	90.5	79.9	10.6
Noon.	.603	.790	.417	.373	86.3	90.5	79.3	11.2
1	.585	.774	.396	.378	86.7	91.5	80.1	11.4
2	.560	.746	.372	.374	86.6	92.0	79.5	12.5
3	.544	.729	.365	.364	86.0	92.5	79.1	13.4
4	.532	.716	.347	.369	85.9	91.7	78.7	13.0
5	.550	.708	.361	.347	85.0	91.0	79.0	12.0
6	.541	.710	.379	.331	84.1	88.0	79.0	9.0
7	.564	.727	.405	.322	83.1	87.1	79.0	8.1
8	.586	.751	.423	.328	82.4	85.8	78.5	7.3
9	.607	.779	.442	.337	82.0	85.0	78.5	6.5
10	.620	.786	.448	.338	81.7	84.4	78.5	5.9
11	.622	.787	.457	.330	81.5	83.5	78.5	5.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	79.6	1.4	78.6	2.4	0.958	10.34	0.80	0.93
1	79.5	1.3	78.6	2.2	.958	.34	.73	.93
2	79.3	1.2	78.5	2.0	.955	.31	.67	.94
3	79.0	1.2	78.2	2.0	.946	.21	.67	.94
4	78.9	1.1	78.1	1.9	.943	.18	.63	.94
5	78.9	0.9	78.3	1.5	.949	.24	.51	.95
6	78.9	0.9	78.3	1.5	.949	.24	.51	.95
7	79.5	1.1	78.7	1.9	.961	.37	.64	.94
8	80.1	1.8	78.8	3.1	.964	.38	1.06	.91
9	80.5	2.8	78.5	4.8	.955	.25	.68	.86
10	81.0	3.9	78.3	6.6	.949	.14	2.35	.81
11	81.2	4.5	78.0	7.7	.940	.03	.77	.78
Noon.	81.4	4.9	78.0	8.3	.940	.03	.99	.77
1	81.4	5.3	78.2	8.5	.946	.07	3.11	.76
2	81.4	5.2	78.3	8.3	.949	.12	.02	.77
3	81.2	4.8	77.8	8.2	.934	9.97	2.94	.77
4	81.1	4.8	77.7	8.2	.931	.94	.93	.77
5	80.8	4.2	77.9	7.1	.937	10.02	.51	.80
6	80.4	3.7	77.8	6.3	.934	.01	.20	.82
7	80.2	2.9	78.2	4.9	.946	.15	1.71	.86
8	79.9	2.5	78.1	4.3	.943	.14	.47	.87
9	79.9	2.1	78.4	3.6	.952	.23	.24	.89
10	79.9	1.8	78.6	3.1	.958	.32	.06	.91
11	79.8	1.7	78.6	2.9	.958	.32	0.99	.91

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	<sup>o</sup>	Inches		lb	Mile.	
1	139.0		SbyW, EbyN&E	1.5	121.6	∩i to 4 A. M. S to 3 P. M., ∩i to 7 P. M., ∩i to 11 P. M. Brisk wind from 9½ A. M. to 1½ P. M. Slightly foggy at midnight D at 5½, 6½, 9½ A. M. & 1 P. M.
2	136.0	0.17	E N E, E & S E	6.0	256.0	∩i to 8 A. M., ∩i to 4 P. M. O to 11 P. M. Strong wind from 8 A. M. to 6½ P. M. Slight R at 4½, 8½, 11½, 12½ A. M. 2½ & 3½ P. M.
3	146.5	0.52	S E & S by E	1.0	250.0	O to 7 A. M., ∩i to 2 P. M. O to 8 P. M. B to 11 P. M. T between 2&3 P. M. R at 4, 6 A. M. 1½ & 2½ P. M.
4	...	0.35	S S E	1.0	109.6	∩i to 4 A. M. O to 11 P. M. T at 11 A. M. Slight R after intervals.
5	140.0	1.43	S S E & S	0.5	145.1	O to 10 A. M., ∩i & ∩i to 6 P. M. B to 11 P. M. R after intervals.
6	141.0	0.40	S S E	...	150.3	B to 2 A. M., ∩i to 7 P. M. B to 11 P. M. T at 3 P. M. Sheet L on W at 11 P. M. Slight R at 7, 8 12½ A. M. & from 1½ to 3 P. M.
7	141.2	0.03	S S E & S E	...	162.0	B to 4 A. M., ∩i to 8 A. M., ∩i to 6 P. M., ∩i to 11 P. M. Sheet L from 6½ to 11 P. M. Light R at 7½ A. M. & 4½ P. M.
8	141.2	0.32	S S E & S by E½	...	104.7	∩i to 6 A. M., ∩i & ∩i to 5 P. M. O to 11 P. M. T at 6½ P. M. Sheet Lat midnight, 9 & 10 P. M. R from 5½ to 7 P. M.
9	140.0	0.21	S by E & S E	0.8	90.8	O to 7 A. M., ∩i to 1 P. M. O to 7 P. M. S to 11 P. M. T from 1½ to 4 P. M. Sheet L at midnight 4 A. M. 10 & 11 P. M. Slight R at 4½ A. M. 2½, 3, 4½ & 9½ P. M.
10	138.0	0.71	SE, S S W & S S E	0.8	101.3	∩i to 1 A. M. O to 4 A. M., ∩i to 7 A. M., ∩i to 11 A. M. O to 4 P. M., ∩i to 7 P. M. S to 11 P. M. T at 11½ A. M., & 1½ P. M. R. from 3 to 4½ & 11½ A. M. to 4 P. M.

∩i Cirri, —i Strati, ∩i Cumuli, ∩i Cirro-strati, ∩i Cumulo-strati, ∩i Nimbi, ∩i Cirro, cumuli-B clear, S stratoni, O overcast, T thunder, L lightning, R. rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	°	Inches		lb	Miles.	
11	...	...	SSE, S & S by E	...	91.9	B to 1 A. M., ☿ to 1 P. M. O to 3 P. M., ☿ to 7 P. M. B to 11 P. M. D at 2 P. M.
12	138.8	...	S by E & SSE	...	116.4	B to 5 A. M., ☿ to 1 P. M. S to 7 P. M., ☿ to 9 P. M. B to 11 P. M.
13	117.0	0.11	S by E, SSE & S	...	117.6	B to 2 A. M., ☿ to 7 A. M., ☿ to 12 A. M. O to 3 P. M., ☿ to 7 P. M. B to 11 P. M. Slight R between 10½ & 12½ A. M.
14	140.7	0.03	S by E	...	152.3	B to 1 A. M., ☿ to 11 P. M. T at 10½ P. M. Light R at 11½ A. M. & 11 P. M.
15	134.0	0.10	S by E & SSE	1.0	129.2	Clouds of different kinds Slight R at 1, 10½, 11½ A. M. 3½, 4½, 5½ & 6 P. M.
16	137.0	0.33	SSE & S by E	0.2	161.5	Clouds of different kinds. Slight R at 2½, 10½ A. M. 1½, 3½, 4½ & 10½ P. M.
17	141.5	0.23	S	...	161.7	Clouds of various kinds. Slight R at 4½, 8½, A. M. & 2½ P. M.
18	147.3	...	S, S by E & SSE	...	131.1	B to 4 A. M., ☿ to 7 A. M., ☿ to 5 P. M. ☿ to 11 P. M. Sheet L on W between 10 & 11 P. M. D at 4½ P. M.
19	140.0	0.09	SSE, SE & S by E	...	120.5	B to 5 A. M., ☿ & ☿ to 2 P. M. S to 11 P. M. T at 2½ A. M. Sheet L from midnight to 2 A. M. & 9 to 11 P. M. R at 7 P. M.
20	149.0	0.32	S by E & SSE	1.0	115.0	B to 3 A. M. S to 10 A. M., ☿ to 3 P. M. S to 7 P. M. O to 11 P. M. T between 1 & 2 P. M. Sheet L at midnight 8 & 11 P. M. R at 5, 11½ A. M. & 1 P. M.
21	147.0	1.25	S by E	0.8	100.2	S to 2 A. M. B to 4 A. M., ☿ to 7 A. M., ☿ to 2 P. M. O to 6 P. M., ☿ to 11 P. M. T from 2½ to 4 P. M. L between 3 & 4 P. M. R at 1 A. M. & from 2 to 5 P. M.

☿ i Cirri, — i Strati, ☿ i Cumuli, ☿ i Cirro-strati, ☿ i Cumulo-strati, ☿ i Nimbi, ☿ i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning  
R. rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1874.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
22	0	Inches	S by E & S S E	b	Miles.	O. T at 7½ & 8½ A. M. Sheet L at 1, 3 & 4 A. M. R from 4½ to 10 A. M. at 1, 2, 9, 10½ & 11 P. M. O to 9 A. M., ∩i to 4 P. M., ∩i to 11 P. M. R after intervals. ∩i to 1 A. M. B to 6 A. M., ∩i & ∩i to 11 A. M., ∩i & ∩i to 5 P. M., ∩i & ∩i to 11 P. M. Sheet L on S between 7 & 8 P. M. D at 2½ P. M. S to 6 A. M. O to 11 A. M. ∩i to 5 P. M., ∩i to 11 P. M. L on S E at 3 A. M. Clouds of different kinds. Slight R after intervals. Scuds to 7 A. M. O to 1 P. M., ∩i to 5 P. M. Scuds to 7 P. M. ∩i to 11 P. M. Slight R from 1½ A. M. to 1½ P. M. S to 5 A. M. O to 9 A. M., ∩i to 4 P. M., ∩i to 7 P. M. B to 11 P. M. Light R at midnight, 6, 7, 7½, A. M. 4 & 4½ P. M. B to 5 A. M., ∩i to 6 P. M. ∩i & ∩i to 11 P. M. ∩i to 4 A. M., B to 7 M. A. ∩i to 6 P. M. ∩i to 11 P. M. Sheet L between 10 & 11 P. M. D at 9 A. M. ∩i to 7 A. M., ∩i to 6 P. M. ∩i to 11 P. M. T between 5 & 6 P. M. Sheet L on W at 7 P. M. D at 5 P. M.
23	138.0	2.96	S S W & S	0.7	143.0	
24	141.2	...	S & S S W	...	148.3	
25	128.8	...	S, S S W & S by W	...	141.4	
26	120.0	0.27	S by W, S S E & S	...	67.3	
27	122.0	0.28	S & S by E	0.8	176.4	
28	138.0	0.08	S by E	0.5	161.8	
29	145.0	...	S by E & S by W	...	96.1	
30	147.5	...	S & S by E	...	80.3	
31	145.6	...	S, S by E & S by W	...	87.2	

∩i Cirri —i Strati, ∩i Cumuli, ∩i Cirro-strati, ∩i Cumulo-strati ∩i Nimbi,  
∩i Cirro-Cumuli, B clear, S stratoni, O overcast, T thunder, L lightning  
R rain, D drizzle.

\* Fell on the 22nd & 23rd.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1874.*

## MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ...	29.587
Max. height of the Barometer occurred at 10 A. M. on the 29th ...	29.818
Min. height of the Barometer occurred at 4 P. M. on the 2nd ...	29.347
Extreme range of the Barometer during the month ...	0.471
Mean of the daily Max. Pressures ...	29.642
Ditto ditto Min. ditto ...	29.521
Mean daily range of the Barometer during the month ...	0.121

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	°
Mean Dry Bulb Thermometer for the month ...	82.9
Max. Temperature occurred at 3 P. M. on the 31st ...	92.5
Min. Temperature occurred at 2, 3 & 4 A. M. on the 23rd ...	77.5
Extreme range of the Temperature during the month ...	15.0
Mean of the daily Max. Temperature ...	88.0
Ditto ditto Min. ditto, ...	79.5
Mean daily range of the Temperature during the month ...	8.5

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Mean Wet Bulb Thermometer for the month ...	80.2
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	2.7
Computed Mean Dew-point for the month ...	78.3
Mean Dry Bulb Thermometer above computed mean Dew-point ...	4.6

	Inches.
Mean Elastic force of Vapour for the month ...	0.949

---

	Troy grain.
Mean Weight of Vapour for the month ...	10.18
Additional Weight of Vapour required for complete saturation ...	1.61
Mean degree of humidity for the month, complete saturation being unity	0.86

	°
Mean Max. Solar radiation Thermometer for the month ...	138.8

---

	Inches.
Rained 28 days,—Max. fall of rain during 24 hours ...	1.43
Total amount of rain during the month ...	10.19
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ...	9.22
Prevailing direction of the Wind ... S. by E, S. S. E. & S.	

\* Height 70 feet 10 inches above ground.











*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1874.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Falt.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.700	29.760	29.634	0.126	86.5	92.0	81.5	10.5
2	.745	.804	.663	.141	85.9	91.5	81.5	10.0
3	.738	.793	.654	.139	85.7	91.6	81.7	9.9
4	.733	.785	.657	.128	83.5	89.8	77.5	12.3
5	.740	.796	.671	.125	84.4	91.2	81.8	9.4
6	.727	.783	.654	.129	81.9	89.5	78.0	11.5
7	.710	.770	.636	.134	81.5	87.0	79.0	8.0
8	.697	.750	.639	.111	82.2	88.7	80.0	8.7
9	.768	.836	.701	.135	79.0	80.4	77.3	3.1
10	.818	.858	.779	.079	79.2	84.5	76.5	8.0
11	.816	.869	.760	.109	78.8	80.6	75.5	5.1
12	.772	.825	.717	.108	80.5	82.5	77.5	5.0
13	.737	.787	.675	.112	81.9	86.5	79.9	6.6
14	.711	.753	.643	.110	83.5	87.6	80.3	7.3
15	.731	.786	.668	.118	83.4	89.0	79.5	9.5
16	.759	.816	.696	.120	83.0	87.0	80.5	6.5
17	.726	.786	.645	.141	83.7	90.5	79.5	11.0
18	.656	.718	.580	.138	84.4	90.0	80.0	10.0
19	.662	.714	.601	.113	84.0	90.3	81.0	9.3
20	.696	.768	.635	.133	84.8	91.7	80.5	11.2
21	.642	.701	.557	.144	85.4	91.6	81.0	10.6
22	.647	.724	.569	.155	86.8	93.7	81.5	12.2
23	.604	.657	.517	.140	84.9	91.8	81.5	10.3
24	.595	.651	.545	.106	81.3	85.5	79.0	6.5
25	.632	.689	.581	.108	80.8	83.8	78.5	5.3
26	.711	.779	.651	.128	79.1	81.0	77.5	3.5
27	.734	.790	.679	.111	82.9	88.5	78.4	10.1
28	.722	.790	.653	.137	83.2	87.5	80.0	7.5
29	.682	.746	.610	.136	83.0	87.5	80.0	7.5
30	.646	.696	.582	.114	80.9	87.5	77.2	10.3

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	81.0	5.5	77.7	8.8	0.931	9.92	3.18	0.76
2	80.6	5.3	76.9	9.0	.908	.68	.19	.75
3	81.0	4.7	77.7	8.0	.931	.94	2.86	.78
4	79.9	3.6	77.4	6.1	.922	.89	.11	.82
5	81.0	3.4	78.6	5.8	.958	10.26	.05	.83
6	79.5	2.4	77.8	4.1	.934	.05	1.39	.88
7	79.3	2.2	77.8	3.7	.934	.05	.26	.89
8	79.9	2.3	78.3	3.9	.949	.20	.34	.88
9	77.5	1.5	76.4	2.6	.893	9.66	0.84	.92
10	77.9	1.3	77.0	2.2	.910	.85	.71	.93
11	77.4	1.4	76.4	2.4	.893	.68	.76	.93
12	79.1	1.4	78.1	2.4	.943	10.18	.80	.93
13	80.2	1.7	79.0	2.9	.970	.44	1.00	.91
14	81.0	2.5	79.2	4.3	.976	.48	.52	.87
15	80.5	2.9	78.5	4.9	.955	.25	.71	.86
16	80.7	2.3	79.1	3.9	.973	.45	.37	.90
17	80.2	3.5	77.7	6.0	.931	9.98	2.09	.83
18	80.6	3.8	77.9	6.5	.937	10.02	.29	.81
19	81.0	3.0	78.9	5.1	.967	.37	1.80	.85
20	81.0	3.8	78.3	6.5	.949	.14	2.32	.81
21	81.1	4.3	78.1	7.3	.943	.08	.60	.80
22	81.6	5.2	78.5	8.3	.955	.18	3.03	.77
23	81.3	3.6	78.8	6.1	.964	.31	2.18	.83
24	79.5	1.8	78.2	3.1	.946	.19	1.05	.91
25	79.4	1.4	78.4	2.4	.952	.27	0.80	.93
26	78.2	0.9	77.6	1.5	.928	.03	.50	.95
27	80.2	2.7	78.3	4.6	.949	.18	1.61	.86
28	80.4	2.8	78.4	4.8	.952	.21	.68	.86
29	80.1	2.9	78.1	4.9	.943	.12	.70	.86
30	78.6	2.3	77.0	3.9	.910	9.81	.29	.88

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid- night.	29.724	29.841	29.608	0.233	81.3	85.1	78.0	7.1
1	.713	.834	.591	.243	81.0	84.7	78.0	6.7
2	.703	.810	.580	.230	80.8	84.4	77.7	6.7
3	.695	.795	.560	.235	80.6	84.0	77.5	6.5
4	.691	.788	.562	.226	80.3	83.7	77.0	6.7
5	.700	.799	.573	.226	80.1	83.3	76.6	6.7
6	.713	.813	.580	.233	79.9	83.0	76.5	6.5
7	.729	.867	.599	.268	80.5	83.3	76.2	7.1
8	.748	.861	.624	.237	82.2	85.4	75.5	9.9
9	.761	.869	.634	.235	83.7	88.3	77.5	10.8
10	.761	.864	.646	.218	85.0	89.2	77.5	11.7
11	.748	.853	.628	.225	86.0	90.5	78.0	12.5
Noon.	.729	.841	.607	.234	86.6	91.3	78.4	12.9
1	.701	.840	.576	.264	86.8	91.7	78.0	13.7
2	.678	.825	.544	.281	86.4	92.8	76.5	16.3
3	.658	.802	.517	.285	85.7	93.7	77.6	16.1
4	.648	.795	.517	.278	85.0	93.3	78.0	15.3
5	.649	.782	.530	.252	84.1	92.5	78.2	14.3
6	.663	.779	.551	.228	83.2	89.5	78.8	10.7
7	.681	.797	.576	.221	82.5	87.0	78.3	8.7
8	.710	.820	.599	.221	82.2	86.5	78.1	8.4
9	.731	.846	.624	.222	81.9	86.0	78.0	8.0
10	.739	.858	.618	.240	81.7	85.5	78.0	7.5
11	.733	.853	.618	.235	81.4	85.4	77.9	7.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	79.8	1.5	78.7	2.6	0.961	10.35	0.89	0.92
1	79.7	1.3	78.8	2.2	.964	.40	.74	.93
2	79.5	1.3	78.6	2.2	.958	.34	.73	.93
3	79.3	1.3	78.4	2.2	.952	.27	.74	.93
4	79.1	1.2	78.3	2.0	.949	.24	.67	.94
5	78.9	1.2	78.1	2.0	.943	.18	.66	.94
6	78.8	1.1	78.0	1.9	.940	.15	.63	.94
7	79.3	1.2	78.5	2.0	.955	.31	.67	.94
8	80.0	2.2	78.5	3.7	.955	.27	1.27	.89
9	80.5	3.2	78.3	5.4	.949	.18	.89	.84
10	80.6	4.4	77.5	7.5	.925	9.88	2.65	.79
11	81.0	5.0	77.5	8.5	.925	.86	3.05	.76
Noon.	81.1	5.5	77.8	8.8	.934	.95	.19	.76
1	81.0	5.8	77.5	9.3	.925	.86	.35	.75
2	80.8	5.6	76.9	9.5	.908	.66	.40	.74
3	80.6	5.1	77.0	8.7	.910	.71	.09	.76
4	80.5	4.5	77.3	7.7	.919	.82	2.71	.78
5	80.2	3.9	77.5	6.6	.925	.90	.31	.81
6	80.1	3.1	77.9	5.3	.937	10.06	1.83	.85
7	80.0	2.5	78.2	4.3	.946	.17	.47	.87
8	79.9	2.3	78.3	3.9	.949	.20	.34	.88
9	79.9	2.0	78.5	3.4	.955	.29	.15	.90
10	79.7	2.0	78.3	3.4	.949	.22	.15	.90
11	79.7	1.7	78.5	2.9	.955	.29	0.98	.91

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations.  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	<sup>o</sup>	Inches		lb	Mile.	
1	144.0	...	S by W & S by E	...	75.6	∩i to 7 A. M. ∩i to 8 P. M., B to 11 P. M. Sheet L on W from 7 to 10 P. M.
2	147.0	...	S S W & S by W	...	86.4	B to 1 A. M., ∩i to 7 P. M. B to 11 P. M.
3	148.8	0.02	S by W, S S W & S	...	102.5	B to 4 A. M., ∩i to 8 A. M., ∩i to 6 P. M., ∩i to 11 P. M. Sheet L from 7 to 11 P. M. Light R at 4½ P. M.
4	145.0	0.20	S, E S E & S S E	0.8	87.2	∩i to 2 A. M. O to 7 A. M., ∩i to 4 P. M. S to 11 P. M. Sheet L on N W at midnight T & L at 4½ A. M. Slight R from 4 to 6 A. M. at 2½ & 4 P. M.
5	149.8	...	...	...	61.2	O to 2 A. M. S to 5 A. M., ∩i to 2 P. M. O to 5 P. M. S to 11 P. M. T between 1½ & 3 & at 4½ P. M. D at 2 & 3 P. M.
6	145.0	1.77	...	...	49.1	∩i to 4 A. M. ∩i to 10 A. M., ∩i to 1 P. M. O to 9 P. M. B to 11 P. M. T & L from 1 to 3½ P. M. R at 9½, 12½ A. M. & from 2½ to 6½ P. M.
7	140.0	0.15	...	...	61.4	S to 5 A. M., ∩i to 8 A. M., ∩i to 3 P. M. O to 8 P. M. S to 11 P. M. Sheet L on N W from Midnight to 2 A. M. Slight R at 2½ A. M. & from 3½ to 5½ P. M.
8	148.0	0.60	...	...	100.2	S to 3 A. M., ∩i to 6 A. M. O to 9 A. M., ∩i to 2 P. M. O to 8 P. M. S to 11 P. M. T from 1½ to 5 P. M. R from 3½ to 6 P. M.
9	...	0.39	S S E	...	109.3	S to 4 A. M. O to 11 P. M. T at 5½ A. M. & 1 P. M. Slight R from 3 A. M. to 4 P. M.

∩i Cirri, —i Strati, ∩i Cumuli, ∩i Cirro-strati, ∩i Cumulo-strati, ∩i Nimbi,  
∩i Cirro, cumuli-B clear, S strati, O overcast, T thunder, L lightning,  
B. rain, D, drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of September 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<sup>o</sup>	Inches		lb	Miles.	
10	122.0	1.81	S S E & S E	...	128.8	O to 4 A. M. S to 7 A. M., $\nearrow$ to 11 A. M. O to 11 P. M. T at 11½ A. M. & 1½ P. M. R at 2½, 9½ & from 11½ A. M. to 6 P. M.
11	...	0.06	S by E	...	93.2	O to 4 A. M., $\searrow$ to 6 A. M. O to 5 P. M., $\searrow$ to 7 P. M. O to 11 P. M. Light R at 3, 5½, 7, 8 A. M. 1, 2, & 3 P. M.
12	102.0	0.13	S by E & S	...	114.0	O to 6 A. M., $\nearrow$ O to 10 A. M. to 4 P. M., $\searrow$ & $\searrow$ to 11 P. M. Slight R from 3½ to 5 A. M. & at 2 & 5 P. M.
13	142.0	1.35	S S E & S	1.4	129.9	S to 11 A. M. O to 3 P. M., $\searrow$ to 6 P. M. S to 8 P. M. B to 11 P. M. Sheet L from 6½ to 8 P. M. R at 7½, 12½ A. M. 1½ & 8½ P. M.
14	146.8	...	S & S S W	...	148.7	B to 4 A. M., $\searrow$ to 7 A. M., $\nearrow$ to 1 P. M. S to 11 P. M. Sheet L from 6½ to 7½ P. M.
15	145.0	...	S W & S by W	...	114.4	$\searrow$ & $\searrow$ to 10 A. M., $\nearrow$ to 3 P. M. S to 6 P. M. O to 11 P. M. Sheet L on N E at 10½ P. M.
16	126.5	...	S by W & S by E	...	130.5	O to 5 A. M., $\searrow$ to 9 A. M. $\nearrow$ to 11 A. M. O to 3 P. M. S to 11 P. M. T at 2½ P. M.
17	146.7	...	S by E & S	...	108.8	B to 4 A. M., $\searrow$ to 7 A. M., $\nearrow$ to 5 P. M., $\searrow$ to 9 P. M., B to 11 P. M. Sheet L on N from 7 to 10 P. M.
18	147.9	...	S by E & S	...	124.7	B to 6 A. M., $\searrow$ & $\nearrow$ to 4 P. M. S to 7 P. M., $\searrow$ to 11 P. M.
19	143.5	...	S by E & S	...	127.5	B to 4 A. M., $\searrow$ & $\nearrow$ to 7 P. M. $\searrow$ to 11 P. M. Sheet L on N W at 7 P. M.
20	147.3	...	S & S S E	...	91.8	$\searrow$ to 8 A. M., $\nearrow$ to 5 P. M., $\searrow$ to 11 P. M. D at 2 P. M.

$\nearrow$  i Cirri, — i Strati,  $\nearrow$  i Cumuli,  $\searrow$  i Cirro-strati,  $\nearrow$  i Cumulo-strati,  $\searrow$  i Nimbi,  $\searrow$  i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning  
R. rain, D. drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1874.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles	
21	143.2	...	S	...	72.0	B to 5 A. M., \i to 7 A. M., \i to 7 P. M., \i to 11 P. M. D at 5 P. M.
22	145.8	...	S, S E & S S E	...	76.5	\i to 2 A. M. B to 5 A. M., \i to 7 A. M., \i to 11 P. M. Sheet L on W at 8 P. M. T & L at 10½ P. M.
23	142.0	2.14	S S E & S by E	3.1	88.7	\i & \i to 2 P. M., O to 8 P. M. S to 11 P. M. T at 3, 4½ & 5 P. M. L from 7 to 9 P. M. R from 2 to 6½ P. M.
24	136.8	0.59	S E	0.7	161.4	Chiefly O. R after intervals.
25	...	0.21	E S E, S S E & S E	...	161.6	O. R after intervals.
26	...	0.44	S S E & S by E	...	163.8	O to 6 P. M. \i & \i to 11 P. M. T & L from Midnight to 3 A. M., & at 10 P. M. Slight R from Midnight to 2 P. M.
27	141.0	...	S S E, S by E & S	...	98.7	\i to 8 A. M., \i to 4 P. M. \i to 11 P. M. D at 1 P. M.
28	131.0	0.04	S by E & S by W	...	109.4	\i to 8 A. M., \i to 11 P. M. L on W at 7 & 8 P. M. Light R at 10 A. M.
29	137.5	0.06	S by W & S	...	75.9	\i to 3 A. M., \i to 7 A. M., \i to 4 P. M., \i to 9 P. M., S to 11 P. M. Sheet L from 6½ to 9 P. M. Light R at 9½ A. M. & 10 P. M.
30	129.7	2.68	S & S by E	2.0	54.0	\i to 4 A. M., O to 10 A. M., \i & \i to 4 P. M., O to 9 P. M., \i to 11 P. M. Brisk wind from 1½ to 5 P. M. T & L from 5 to 9 P. M. R from 5 to 8 A. M. & 4½ to 9 P. M.

\i Cirri —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati \i Nimbi.  
\i Cirro-Cumuli, B clear, S stratoni, O overcast, T thunder, L lightning  
R rain, D. drizzle.







*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1874.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day		
		Max.	Min.	Diff.		Max.	Min.	Diff
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.660	29.719	29.603	0.116	84.0	90.0	79.5	10.5
2	.685	.734	.638	.096	81.7	85.6	79.5	6.1
3	.674	.739	.597	.142	81.9	88.0	78.7	9.3
4	.698	.764	.645	.119	81.6	87.3	77.0	10.3
5	.761	.809	.708	.101	82.2	89.0	78.0	11.0
6	.783	.835	.733	.102	82.3	88.0	78.0	10.0
7	.780	.840	.700	.140	83.4	90.0	79.0	11.0
8	.785	.851	.724	.127	82.9	88.3	79.6	8.7
9	.793	.858	.711	.147	83.7	90.0	79.5	10.5
10	.816	.883	.761	.122	83.7	90.0	80.0	10.0
11	.804	.888	.732	.156	83.8	90.8	80.5	10.3
12	.760	.824	.697	.127	84.0	91.0	80.0	11.0
13	.764	.831	.705	.126	84.3	90.8	79.5	11.3
14	.768	.817	.730	.087	82.0	89.2	77.5	11.7
15	.669	.772	.534	.238	78.4	79.7	77.5	2.2
16	.648	.770	.486	.284	79.4	83.5	77.0	6.5
17	.798	.852	.741	.111	80.8	87.0	74.5	12.5
18	.841	.909	.785	.124	83.1	89.0	77.5	11.5
19	.853	.924	.807	.117	82.3	87.5	79.0	8.5
20	.838	.926	.763	.163	80.0	86.0	74.5	11.5
21	.809	.879	.747	.132	80.4	87.0	74.0	13.0
22	.805	.874	.741	.133	82.7	88.5	77.0	11.5
23	.822	.891	.774	.117	82.9	88.8	78.8	10.0
24	.863	.923	.806	.117	82.8	88.5	79.3	9.2
25	.867	.939	.822	.117	78.8	86.2	76.4	9.8
26	.832	.884	.788	.096	77.6	81.0	75.0	6.0
27	.847	.894	.813	.081	76.4	79.0	75.5	3.5
28	.838	.896	.790	.106	77.9	81.4	75.3	6.1
29	.827	.879	.771	.105	80.4	84.9	77.3	7.6
30	.854	.906	.797	.109	80.4	84.0	77.2	6.8
31	.921	.985	.874	.111	80.1	84.7	76.5	8.2

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived, from the hourly observations, made at the  
several hours during the day.







*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1874.*

Latitude  $22^{\circ} 33' 1''$  North. Longitude  $88^{\circ} 20' 34''$  East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at $32^{\circ}$ Falt.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.660	29.719	29.603	0.116	84.0	90.0	79.5	10.5
2	.685	.734	.638	.096	81.7	85.6	79.5	6.1
3	.674	.739	.597	.142	81.9	88.0	78.7	9.3
4	.698	.764	.645	.119	81.6	87.3	77.0	10.3
5	.761	.809	.708	.101	82.2	89.0	78.0	11.0
6	.783	.835	.733	.102	82.3	88.0	78.0	10.0
7	.780	.840	.700	.140	83.4	90.0	79.0	11.0
8	.785	.851	.724	.127	82.9	88.3	79.6	8.7
9	.793	.858	.711	.147	83.7	90.0	79.5	10.5
10	.816	.883	.761	.122	83.7	90.0	80.0	10.0
11	.804	.888	.732	.156	83.8	90.8	80.5	10.3
12	.760	.824	.697	.127	84.0	91.0	80.0	11.0
13	.764	.831	.705	.126	84.3	90.8	79.5	11.3
14	.768	.817	.730	.087	82.0	89.2	77.5	11.7
15	.669	.772	.534	.238	78.4	79.7	77.5	2.2
16	.648	.770	.486	.284	79.4	83.5	77.0	6.5
17	.798	.852	.741	.111	80.8	87.0	74.5	12.5
18	.841	.909	.785	.124	83.1	89.0	77.5	11.5
19	.853	.924	.807	.117	82.3	87.5	79.0	8.5
20	.838	.926	.763	.163	80.0	86.0	74.5	11.5
21	.809	.879	.747	.132	80.4	87.0	74.0	13.0
22	.805	.874	.741	.133	82.7	88.5	77.0	11.5
23	.822	.891	.774	.117	82.9	88.8	78.8	10.0
24	.863	.923	.806	.117	82.8	88.5	79.3	9.2
25	.867	.939	.822	.117	78.8	86.2	76.4	9.8
26	.832	.884	.788	.096	77.6	81.0	75.0	6.0
27	.847	.894	.813	.081	76.4	79.0	75.5	3.5
28	.838	.896	.790	.106	77.9	81.4	75.3	6.1
29	.827	.879	.771	.105	80.4	84.9	77.3	7.6
30	.854	.906	.797	.109	80.4	84.0	77.2	6.8
31	.921	.985	.874	.111	80.1	84.7	76.5	8.2

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	79.5	4.5	76.3	7.7	0.890	9.53	2.64	0.78
2	77.8	3.9	75.1	6.6	.857	.21	.16	.81
3	79.1	2.8	77.1	4.8	.913	.82	1.62	.86
4	77.8	3.8	75.1	6.5	.857	.21	2.13	.81
5	78.4	3.8	75.7	6.5	.873	.38	.16	.81
6	79.2	3.1	77.0	5.3	.910	.79	1.79	.85
7	79.3	4.1	76.4	7.0	.893	.58	2.38	.80
8	79.7	3.2	77.5	5.4	.925	.94	1.85	.84
9	80.1	3.6	77.6	6.1	.928	.95	2.12	.82
10	80.2	3.5	77.7	6.0	.931	.98	.09	.83
11	80.3	3.5	77.8	6.0	.934	10.01	.09	.83
12	80.1	3.9	77.4	6.6	.922	9.87	.30	.81
13	79.5	4.8	76.1	8.2	.885	.48	.80	.77
14	76.2	5.8	72.1	9.9	.778	8.36	3.11	.73
15	77.0	1.4	76.0	2.4	.882	9.56	0.75	.93
16	76.8	2.6	75.0	4.4	.854	.24	1.38	.87
17	77.3	3.5	74.8	6.0	.849	.15	.92	.83
18	79.0	4.1	76.1	7.0	.885	.50	2.36	.80
19	77.4	4.9	74.0	8.3	.827	8.90	.68	.77
20	73.5	6.5	68.9	11.1	.701	7.57	3.24	.70
21	75.2	5.2	71.6	8.8	.766	8.25	2.69	.75
22	77.6	5.1	74.0	8.7	.827	.88	.84	.76
23	78.7	4.2	75.8	7.1	.876	9.41	.38	.80
24	78.7	4.1	75.8	7.0	.876	.41	.34	.80
25	76.4	2.4	74.7	4.1	.846	.16	1.28	.88
26	75.6	2.0	74.2	3.4	.832	.04	.03	.90
27	75.4	1.0	74.7	1.7	.846	.19	0.53	.95
28	76.9	1.0	76.2	1.7	.887	.62	.54	.95
29	78.1	2.3	76.5	3.9	.896	.67	1.27	.88
30	77.7	2.7	75.8	4.6	.876	4.4	.50	.86
31	76.0	4.1	73.1	7.0	.803	8.67	2.17	.80

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.787	29.887	29.530	0.357	79.4	82.0	76.0	6.0
1	.777	.814	.507	.377	79.1	81.9	75.6	6.3
2	.769	.874	.486	.388	78.8	81.8	75.4	6.4
3	.760	.877	.493	.384	78.5	81.6	75.0	6.6
4	.763	.882	.519	.363	78.3	81.4	74.7	6.7
5	.777	.895	.533	.362	78.0	81.2	74.3	6.9
6	.793	.908	.581	.327	77.9	81.0	74.0	7.0
7	.814	.938	.611	.327	78.4	81.5	75.1	6.4
8	.836	.968	.659	.309	80.3	83.3	75.5	7.8
9	.849	.985	.691	.294	82.2	86.0	75.8	10.2
10	.849	.983	.704	.279	83.8	87.0	77.0	10.0
11	.835	.967	.705	.262	84.9	88.5	77.7	10.8
Noon.	.810	.942	.681	.261	85.6	90.6	77.5	13.1
1	.783	.920	.645	.275	85.7	91.0	77.5	13.5
2	.759	.887	.623	.264	85.9	90.8	77.5	13.3
3	.744	.879	.603	.276	85.8	90.5	77.6	12.9
4	.739	.878	.597	.281	81.8	90.0	77.0	13.0
5	.747	.894	.603	.291	83.7	90.0	75.5	14.5
6	.755	.901	.570	.331	82.0	86.5	75.5	11.0
7	.773	.926	.568	.358	81.3	85.2	75.5	9.7
8	.795	.952	.578	.374	80.8	84.0	75.7	8.3
9	.807	.958	.540	.418	80.5	83.5	75.8	7.7
10	.811	.964	.534	.430	80.0	82.6	76.0	6.6
11	.808	.955	.538	.417	79.6	82.0	76.0	6.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	77.6	1.8	76.3	3.1	0.890	9.63	0.99	0.91
1	77.4	1.7	76.2	2.9	.887	.60	.93	.91
2	77.2	1.6	76.1	2.7	.885	.57	.87	.92
3	77.0	1.5	75.9	2.6	.879	.51	.84	.92
4	76.8	1.5	75.7	2.6	.873	.45	.83	.92
5	76.7	1.3	75.8	2.2	.876	.50	.69	.93
6	76.5	1.4	75.5	2.4	.868	.42	.74	.93
7	76.9	1.5	75.8	2.6	.876	.48	.83	.92
8	77.7	2.6	75.9	4.4	.879	.49	1.42	.87
9	78.2	4.0	75.4	6.8	.865	.30	2.24	.81
10	78.7	5.1	75.1	8.7	.857	.17	.93	.76
11	79.0	5.9	74.9	10.0	.851	.09	3.40	.73
Noon.	79.2	6.4	74.7	10.9	.846	.03	.73	.71
1	78.9	6.8	74.1	11.6	.830	8.85	.95	.69
2	78.9	7.0	74.0	11.9	.827	.82	4.05	.69
3	78.8	7.0	73.9	11.9	.824	.79	.04	.69
4	78.2	6.6	73.6	11.2	.817	.73	37.3	.70
5	78.1	5.6	74.2	9.5	.832	.91	.16	.74
6	77.9	4.1	75.0	7.0	.854	9.18	2.29	.80
7	77.9	3.4	75.5	5.8	.868	.35	1.89	.83
8	78.0	2.8	76.0	4.8	.882	.50	.57	.86
9	78.0	2.5	76.2	4.3	.887	.58	.40	.87
10	77.9	2.1	76.4	3.6	.893	.64	.17	.89
11	77.7	1.9	76.4	3.2	.893	.66	.03	.90

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches.		lb	Mile.	
1	140.0	...	S by E & N W	...	47.9	∖i to 8 A. M., ∖i to 4 P. M. B to 11 P. M.
2	114.0	0.02	NW, NNW & NN	...	108.0	∖i to 5 A. M. S to 1 P. M. O to 11 P. M. Light R at 3 & 7 P. M.
3	118.0	0.12	N N E & E	0.8	138.1	∖i to 4 A. M. S to 8 A. M., ∖i to 7 P. M. O to 11 P. M. Sheet L at Midnight 1 A. M. & 8 P. M. Light R at 5½, 7 A. M. 1, 2½, 5, 8 & 10 P. M.
4	140.0	0.08	S S E & S by E	2.0	30.0	O to 5 A. M., ∖i to 11 P. M. Brisk wind between 1 & 2 A. M. Light R at 1½ & 10½ A. M.
5	143.4	...	S E & S S E	0.7	114.0	B to 2 A. M., ∖i to 6 P. M. B to 11 P. M.
6	128.5	0.21	S S E & E S E	...	125.1	B to 6 A. M., ∖i to 8 P. M. B to 11 P. M. T from 12½ to 2 P. M. R at 12½ A. M.
7	147.2	1.03	E S E, S E & S S E	...	81.9	B to 4 A. M., ∖i to 7 A. M., ∖i to 5 P. M. O to 11 P. M. L from 6 to 10 P. M. T & R from 6 to 8 P. M.
8	139.0	0.17	S S E, S E & S by E	...	54.0	S to 4 A. M., ∖i to 9 A. M., ∖i to 3 P. M. O to 6 P. M., ∖i to 11 P. M. Slightly foggy from 5 to 7 A. M. R between 4 & 5 P. M.
9	138.9	0.02	S by E & S S E	...	61.9	B to 5 A. M., ∖i to 9 P. M. B to 11 P. M. L on N at 7 & 8 P. M. Light R at 5 P. M.
10	148.7	...	S S E	...	55.6	B to 5 A. M., ∖i to 7 A. M., ∖i to 8 P. M., ∖i to 11 P. M. Sheet L at 3 A. M. & from 7 to 9 P. M. D at 4½ P. M.
11	144.5	0.06	S S E & N N E	...	46.5	B to 4 A. M., ∖i to 7 A. M., ∖i to 6 P. M. B to 11 P. M. T at 3 P. M. Sheet L at 7 & 11 P. M. Light R at 3½ P. M.

∖i Cirri, —i Strati, ∖i Cumuli, ∖i Cirro-strati, ∖i Cumulo-strati, ∖i Nimbi,  
∖i Cirro, cumuli-B clear, S straton, O overcast, T thunder, L lightning,  
R. rain, D, drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of October 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches	[by S. & E.]	lb	Mic s.	
12	143.0	0.19	N N E, E by N & E	4.0	67.3	B to 5 A. M., \i to 7 A. M., \i to 7 P. M. B to 11 P. M. Strong wind from 4½ to 5 P. M. Slightly foggy at 4 & 5 A. M. Sheet Lon N W from midnight to 3 A. M. T & L from 4 to 7 P. M. R at 3 & 5 P. M.
13	140.5	...	E by S & E	...	102.7	B to 4 A. M. O to 7 A. M. B to 10 A. M., \i to 5 P. M., \i to 7 P. M. B to 11 P. M. Foggy at 5 & 6 A. M.
14	139.0	...	E & S E	0.8	177.8	\i to 11 A. M. S to 11 P. M.
15	...	1.27	N E, E N E & E	12.0	198.1	O. Gale from 5 to 11 P. M. T between 11 & 12 A. M. R nearly the whole day.
16	126.0	*4.56	S, S W & W S W	8.0	584.6	O to 10 A. M. S to 7 P. M. B to 11 P. M. Gale from midnight to 5½ A. M. Brisk wind from 5½ to 10 A. M. R from midnight to 9 A. M.
17	137.5	...	W S W & S	...	110.5	B to 5 A. M., \i to 11 A. M. \i to 4 P. M. B to 11 P. M. Slightly foggy from 8 to 11 P. M.
18	146.2	...	W S W & W by S	...	45.9	B to 9 A. M., \i to 6 P. M. B to 11 P. M. Slightly foggy from midnight to 4 A. M. & 7 to 10 P. M.
19	136.2	...	[N N W W by S, N W &	...	56.0	B to 2 A. M., \i to 5 P. M. B to 11 P. M. D at 7½ A. M.
20	135.0	...	N N W & N W	...	101.9	B. Slightly foggy from 9 to 11 P. M.
21	139.0	...	N W & N by W	...	84.1	B to 10 A. M., \i to 3 P. M., \i to 5 P. M. B to 11 P. M.
22	138.7	...	N by W	...	42.1	B to 7 A. M., \i to 9 A. M. \i to 5 P. M. B to 11 P. M. Slightly foggy from 2 to 4 A. M.
23	133.0	...	N E & N by E	...	46.9	B to 8 A. M., \i to 5 P. M. B to 11 P. M. Slightly foggy from 7 to 11 P. M.

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,  
\i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning  
R. rain, D. drizzle.

\* Fell after 4 P. M. of the 15th to 9 A. M. of the 16th.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
& in the month of October 1874.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		fb.	Miles	
24	143.0	...	N N E, N & S E	1.6	16.8	∩i to 3 A. M. B to 8 A. M., ∩i to 8 P. M. B to 11 P. M. Slightly foggy from midnight to 9 A. M.
25	120.0	1.60	S E & S S E	...	115.2	B to 6 A. M., ∩i to 12 A. M. O to 9 P. M. S to 11 P. M. R from 12½ A. M. to 5 P. M.
26	...	...	S S E & E S E	...	150.1	S to 3 A. M. O to 9 A. M. S to 2 P. M. O to 11 P. M. Dat 9 A. M. 3, 5½, 6, 7, 9, 10 & 11 P. M.
27	...	1.39	E S E & E	...	121.0	O. R nearly the whole day.
28	...	2.56	S E & S	2.0	135.7	O to 5 P. M. ∩i to 8 P. M., ∩i to 11 P. M. R from 2 to 11. A. M.
29	133.0	0.43	S E & S by E	...	162.8	∩i to 8 A. M., ∩i to 6 P. M. B to 11 P. M. T at 11½ & 12½ A. M. Sheet L on N W at 8 P. M. R from 10½ to 12 A. M. & at 3 P. M.
30	137.5	...	S by E, S, & W	...	125.1	B to 5 A. M., ∩i to 3 P. M., ∩i to 5 P. M. B to 11 P. M. Slightly foggy from 9 to 11 P. M. Dat 8½ A. M.
31	131.0	...	W & N N W	...	81.1	B to 1 A. M. ∩i to 5 A. M. B to 8 A. M., ∩i to 3 P. M. ∩i to 7 P. M. B to 11 P. M. Slightly foggy at midnight.

∩i Cirri —i Strati, ∩i Cumuli, ∩i Cirro-strati, ∩i Cumulo-strati ∩i Nimbi,  
∩i Cirro-Cumuli, B clear, S stratoni, O overcast, T thunder, L lightning  
R rain, D. drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1874.*

## MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.789
Max. height of the Barometer occurred at 9 A. M. on the 31st	29.985
Min. height of the Barometer occurred at 2 A. M. on the 16th	29.486
Extreme range of the Barometer during the month	0.499
Mean of the daily Max. Pressures ... ..	29.855
Ditto ditto Min. ditto ... ..	29.727
Mean daily range of the Barometer during the month	0.128

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	°
Mean Dry Bulb Thermometer for the month ... ..	81.5
Max. Temperature occurred at 1 P. M. on the 12th	91.0
Min. Temperature occurred at 6 A. M. on the 21st	74.0
Extreme range of the Temperature during the month	17.0
Mean of the daily Max. Temperature ... ..	86.9
Ditto ditto Min. ditto, . ... ..	77.7
Mean daily range of the Temperature during the month	9.2

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Mean Wet Bulb Thermometer for the month ... ..	77.9
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	3.6
Computed Mean Dew-point for the month ... ..	75.4
Mean Dry Bulb Thermometer above computed mean Dew-point	6.1

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.865

---

	Troy grain.
Mean Weight of Vapour for the month ... ..	9.32
Additional Weight of Vapour required for complete saturation	1.99
Mean degree of humidity for the month, complete saturation being unity	0.82

	°
Mean Max. Solar radiation Thermometer for the month ... ..	136.3

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	Inches.
Rained 19 days,—Max. fall of rain during 24 hours ... ..	4.56
Total amount of rain during the month ... ..	13.71
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	12.24
Prevailing direction of the Wind ... S. S. E. & S. E.	

\* Height 70 feet 10 inches above ground.



*Abstract of the Results of the Hourly Meteorological Observations taken at the S. G. O. Calcutta, in the month of Oct. 1874.*

### MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible][illegible]







*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1874.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observation and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.944	29.998	29.901	0.097	80.9	85.6	77.0	8.6
2	.942	30.003	.888	.115	80.8	84.7	77.7	7.0
3	.952	.021	.904	.117	79.9	84.6	77.4	7.2
4	.971	.032	.923	.109	79.9	85.8	76.4	9.4
5	.973	.048	.923	.125	81.2	87.3	76.9	10.4
6	.948	.029	.881	.148	80.3	86.3	76.5	9.8
7	.931	.006	.872	.134	77.6	83.3	73.0	10.3
8	.934	29.999	.874	.125	75.8	83.0	69.5	13.5
9	.941	.992	.884	.108	77.9	84.7	72.0	12.7
10	.945	30.012	.881	.131	78.8	84.3	73.7	10.6
11	.943	.010	.882	.128	77.7	81.7	74.5	7.2
12	.941	.008	.899	.109	77.1	81.0	74.5	6.5
13	.958	.019	.910	.109	76.8	81.5	73.4	8.1
14	.985	.054	.929	.125	77.8	84.8	72.0	12.8
15	.995	.059	.951	.108	76.9	84.2	71.0	13.2
16	30.015	.078	.961	.117	75.2	81.7	69.8	11.9
17	.032	.092	.981	.111	76.0	83.4	70.0	13.4
18	.010	.076	.957	.119	75.9	81.5	71.7	9.8
19	29.988	.058	.942	.116	74.2	80.6	68.0	12.6
20	.996	.078	.931	.147	73.0	80.0	67.0	13.0
21	.995	.062	.949	.113	71.8	79.3	66.0	13.3
22	.988	.045	.937	.108	69.4	76.7	63.6	13.1
23	.992	.060	.931	.129	68.9	77.0	61.5	15.5
24	.989	.055	.939	.116	69.0	77.1	61.5	15.6
25	30.025	.096	.975	.121	69.6	77.9	63.0	14.9
26	.056	.130	30.009	.121	69.9	77.8	63.0	14.8
27	.039	.112	29.985	.127	69.2	78.4	62.0	16.4
28	.010	.095	.956	.139	68.7	77.7	61.5	16.2
29	.005	.069	.957	.112	69.0	78.2	61.4	16.8
30	.027	.102	.971	.131	69.1	78.2	61.3	16.9

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	77.4	3.5	74.9	6.0	0.851	9.17	1.93	0.83
2	78.1	2.7	76.2	4.6	.887	.56	.51	.86
3	77.1	2.8	75.1	4.8	.857	.25	.53	.86
4	77.1	2.8	75.1	4.8	.857	.25	.53	.86
5	76.5	4.7	73.2	8.0	.806	8.68	2.53	.77
6	74.4	5.9	70.3	10.0	.734	7.92	.99	.73
7	71.3	6.3	66.9	10.7	.657	.12	.95	.71
8	68.8	7.0	63.9	11.9	.595	6.47	3.07	.68
9	70.9	7.0	66.0	11.9	.638	.91	.25	.68
10	74.2	4.6	71.0	7.8	.751	8.12	2.32	.78
11	75.2	2.5	73.4	4.3	.811	.80	1.30	.87
12	71.2	5.9	67.1	10.0	.691	7.17	2.75	.72
13	72.6	4.2	69.7	7.1	.720	.82	.01	.80
14	72.8	5.0	69.3	8.5	.711	.69	.44	.76
15	70.4	6.5	65.8	11.1	.634	6.89	.97	.70
16	68.2	7.0	63.3	11.9	.584	.35	3.02	.68
17	69.5	6.5	64.9	11.1	.615	.70	2.90	.70
18	69.6	6.3	65.2	10.7	.621	.67	.81	.71
19	67.3	6.9	62.5	11.7	.568	.20	.89	.68
20	66.7	6.3	61.7	11.3	.554	.05	.71	.69
21	65.2	6.6	59.9	11.9	.521	5.71	.74	.68
22	62.6	6.8	57.2	12.2	.476	.24	.62	.67
23	62.6	6.3	57.6	11.3	.483	.32	.42	.69
24	62.9	6.1	58.0	11.0	.489	.39	.37	.70
25	63.8	5.8	59.2	10.4	.509	.62	.28	.71
26	63.3	6.6	58.0	11.9	.489	.38	.60	.67
27	62.4	6.8	57.0	12.2	.473	.21	.60	.67
28	62.4	6.3	57.4	11.3	.480	.29	.40	.69
29	63.2	5.8	58.6	10.4	.499	.51	.25	.71
30	62.6	6.5	57.4	11.7	.480	.28	.50	.68

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.983	30.056	29.921	0.135	72.2	79.2	64.5	14.7
1	.974	.047	.912	.135	71.7	79.0	61.0	15.0
2	.966	.043	.899	.144	71.2	78.7	63.5	15.2
3	.958	.037	.903	.134	70.7	78.4	63.0	15.4
4	.958	.035	.908	.127	70.3	78.2	62.4	15.8
5	.971	.051	.922	.129	70.0	78.0	62.0	16.0
6	.989	.065	.937	.128	69.6	77.7	61.4	16.3
7	30.009	.086	.960	.126	69.9	77.9	61.3	16.6
8	.030	.110	.975	.135	72.3	80.5	63.2	17.3
9	.049	.130	.992	.138	75.4	83.0	66.8	16.2
10	.046	.117	.992	.125	77.6	84.0	70.2	13.8
11	.027	.106	.967	.139	79.2	85.8	73.5	12.3
Noon.	29.999	.078	.945	.133	80.2	86.6	75.0	11.6
1	.968	.047	.914	.133	80.9	87.3	75.6	11.7
2	.945	.019	.893	.126	81.2	85.8	76.7	9.1
3	.933	.009	.874	.135	81.1	87.3	75.8	11.5
4	.932	.010	.872	.138	80.0	86.0	75.3	10.7
5	.940	.019	.873	.146	78.6	84.5	73.0	11.5
6	.952	.028	.890	.138	76.8	82.8	71.0	11.8
7	.970	.046	.906	.140	75.4	81.5	69.5	12.0
8	.986	.061	.912	.149	74.5	81.0	68.0	13.0
9	.997	.059	.925	.134	73.8	80.3	67.2	13.1
10	30.001	.078	.927	.151	73.1	79.6	66.0	13.6
11	29.996	.071	.926	.145	72.4	79.2	65.3	13.9

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	69.2	3.0	66.8	5.4	0.655	7.19	1.36	0.84
1	68.7	3.0	66.3	5.4	.644	.08	.35	.84
2	68.2	3.0	65.8	5.4	.634	6.97	.33	.84
3	67.8	2.9	65.5	5.2	.628	.91	.27	.85
4	67.5	2.8	65.3	5.0	.623	.86	.22	.85
5	67.1	2.9	64.8	5.2	.613	.76	.24	.85
6	66.9	2.7	64.7	4.9	.611	.73	.17	.85
7	67.0	2.9	64.7	5.2	.611	.73	.25	.84
8	68.0	4.3	64.6	7.7	.609	.67	.91	.78
9	69.1	3.3	64.7	10.7	.611	.65	2.78	.71
10	69.9	7.7	64.5	13.1	.607	.58	3.49	.65
11	70.5	8.7	64.4	14.8	.605	.54	4.02	.62
Noon.	70.4	9.8	63.5	16.7	.588	.33	.55	.58
1	70.8	10.1	63.7	17.2	.591	.37	.73	.57
2	71.0	10.2	63.9	17.3	.595	.40	.81	.57
3	70.8	10.3	63.6	17.5	.590	.33	.84	.57
4	70.4	9.6	63.7	16.3	.591	.38	.43	.59
5	70.5	8.1	64.8	13.8	.613	.64	3.74	.64
6	71.0	5.8	66.9	9.9	.657	7.13	2.70	.73
7	70.7	4.7	67.4	8.0	.668	.27	.16	.77
8	70.2	4.3	67.2	7.3	.664	.25	1.93	.79
9	69.9	3.9	67.2	6.6	.664	.25	.73	.81
10	69.5	3.6	66.6	6.5	.651	.11	.68	.81
11	69.1	3.3	66.5	5.9	.648	.10	.50	.83

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches	[E S E]	lb	Mile.	
1	130.8	...	N N W, E by N &	...	92.1	☁ to 6 A.M., ☁ to 10 A.M., ☁ to 4 P.M. S to 8 P.M. B to 11 P.M. Sheet L on S between 5 & 6 P.M.
2	125.0	...	E S E & E	...	70.7	☁ to 2 A.M. S to 6 P.M., ☁ to 11 P.M.
3	141.8	...	E & S E	...	32.3	☁ to 4 A.M., ☁ to 8 A.M., ☁ to Noon, O to 5 P.M. S to 8 P.M. B to 11 P.M. T & D at 1 P.M.
4	134.5	0.06	S E & E S E	...	45.4	B to 3 A.M., ☁ to 9 A.M., ☁ to 4 P.M., ☁ to 6 P.M. B to 11 P.M. Slightly foggy from 7 to 11 P.M. Light R at 2 P.M.
5	134.5	...	E S E & E by N	...	83.7	B to 2 A.M., ☁ to 5 A.M., ☁ to 10 A.M., ☁ to 5 P.M. B to 11 P.M. Slightly foggy from midnight to 2 A.M.
6	133.0	...	E by N	...	132.2	B to 3 A.M., ☁ to 1 P.M. ☁ to 4 P.M. B to 11 P.M.
7	130.0	...	E by N & N E	...	108.9	B to 3 A.M., ☁ to 6 P.M. B to 11 P.M. Slightly foggy from midnight to 3 A.M.
8	133.7	...	N E & E N E	...	120.9	B to 5 A.M., ☁ to 8 A.M. B to 11 A.M., ☁ to 5 P.M. B to 11 P.M.
9	132.0	...	E N E & E by N	...	195.1	B to 1 A.M. S to 5 A.M., ☁ to 7 P.M. O to 11 P.M.
10	133.0	...	[E by S] E N E, E by N &	...	187.5	O to 7 A.M., ☁ & ☁ to 11 A.M., ☁ to 6 P.M., ☁ to 11 P.M. D at 3½ P.M.
11	119.0	0.06	E by S & E	...	120.0	☁ to 2 A.M. S to 7 A.M., ☁ to 11 A.M. O to 11 P.M. Light R at 12½ & 5½ P.M.
12	116.0	...	E & by E by N	...	175.5	Chiefly O. D at 3½ A.M.
13	127.0	...	E by N & E N E	...	202.2	O to Noon, ☁ to 5 P.M. S to 9 P.M. B to 11 P.M. D at 4 A.M.
14	129.0	...	E N E	...	201.6	☁ to 2 A.M. B to 11 A.M., ☁ to 4 P.M., ☁ to 9 P.M. B to 11 P.M.
15	130.5	...	E N E & N N W	...	227.2	B to 6 A.M., ☁ to 9 A.M. B to Noon, ☁ to 3 P.M. B to 11 P.M.

☁ Cirri, —i Strati, ☁ Cumuli, ☁ Cirro-strati, ☁ Cumulo-strati, ☁ Nimbi,  
☁ Cirro, cumuli-B clear, S straton, O overcast, T thunder, L lightning,  
R. rain, D, drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of November 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Mies.	
16	133.0	...	N by W	...	190.7	B to 4 A. M., \i to 4 P. M. B to 9 P. M., \i to 11 P. M.
17	133.0	...	N by W & N by E	...	104.2	B to 3 A. M., \i to 1 P. M. \i to 11 P. M.
18	129.5	...	N N E & W N W	...	73.9	\i to 6 A. M., \i to Noon, \i to 6 P. M., \i to 11 P. M.
19	129.0	...	W N W & N by W	...	36.2	\i to 4 A. M. B to 3 P. M., \i to 7 P. M. B to 11 P. M. Slightly foggy at 8 & 9 P. M.
20	134.0	...	N by W & N by E	...	59.7	B to 10 A. M., \i to 1 P. M., \i to 3 P. M. B to 11 P. M. Slightly foggy at 8 & 9 P. M.
21	125.5	...	N by E	...	50.3	Chiefly B.
22	126.5	...	N by E & N	...	63.2	B to 5 A. M., \i to 8 A. M. B to 11 A. M., \i to 6 P. M. B to 11 P. M. Slightly foggy from 9 to 11 P. M.
23	128.2	...	N & N by E	...	59.1	B to 6 A. M. \i to 11 P. M. Foggy from midnight to 2 A. M. & 7 to 10 P. M.
24	124.5	...	N by E & N W	...	39.5	\i to 1 A. M. B to 11 A. M., \i to 11 P. M. Slightly foggy from 8 to 11 P. M.
25	123.0	...	N W & N by W	...	58.2	B to 4 A. M., \i to 11 P. M. Slightly foggy at midnight.
26	124.0	...	N by W & N	...	98.0	Chiefly \i.
27	127.0	...	N by W & N N W	...	71.2	\i to 2 A. M. B to 5 A. M., \i to 6 P. M. B to 11 P. M.
28	124.0	...	NNW & WNW	...	49.5	Chiefly \i
29	124.0	...	WNW & N by W	...	55.4	Chiefly B. Slightly foggy from 7 to 11 P. M.
30	128.8	...	NNW, N & N by W	...	24.8	B.

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning B. rain, D. drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1874.*

MONTHLY RESULTS.

---

	Inches.
Mean height of the Barometer for the month ... ..	29.982
Max. height of the Barometer occurred at 9 A. M. on the 26th ...	30.130
Min. height of the Barometer occurred at 4 P. M. on the 7th ...	29.872
Extreme range of the Barometer during the month ... ..	0.258
Mean of the daily Max. Pressures ... ..	30.050
Ditto ditto Min. ditto ... ..	29.929
Mean daily range of the Barometer during the month ... ..	0.121

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	°
Mean Dry Bulb Thermometer for the month ... ..	74.9
Max. Temperature occurred at 1 & 3 P. M. on the 5th ... ..	87.3
Min. Temperature occurred at 7 A. M. on the 30th ... ..	61.3
Extreme range of the Temperature during the month ... ..	26.0
Mean of the daily Max. Temperature ... ..	81.6
Ditto ditto Min. ditto, ... ..	69.6
Mean daily range of the Temperature during the month ... ..	12.0

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Mean Wet Bulb Thermometer for the month ... ..	69.3
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	5.6
Computed Mean Dew-point for the month ... ..	65.4
Mean Dry Bulb Thermometer above computed mean Dew-point ...	9.5

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.626

---

	Troy grain.
Mean Weight of Vapour for the month ... ..	6.81
Additional Weight of Vapour required for complete saturation ...	2.47
Mean degree of humidity for the month, complete saturation being unity	0.73

	°
Mean Max. Solar radiation Thermometer for the month ... ..	128.8

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	Inches.
Rained 6 days,—Max. fall of rain during 24 hours ... ..	0.06
Total amount of rain during the month ... ..	0.12
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ... ..	0.06
Prevailing direction of the Wind ... N. by W. & E. by N. ...	

\* Height 70 feet 10 inches above ground.



### MONTHLY RESULTS:

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]



*Meteorological Observations.*

xcv

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1874.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahit.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	30.039	30.110	29.984	0.126	68.9	78.3	61.8	16.5
2	.032	.112	.972	.140	68.4	77.5	61.5	16.0
3	.051	.128	30.001	.127	68.2	77.0	60.0	17.0
4	.063	.138	.010	.128	68.8	77.5	61.9	15.6
5	.058	.119	.005	.114	68.4	77.2	60.5	16.7
6	.069	.143	.020	.123	67.8	77.6	60.0	17.6
7	.072	.146	.022	.124	67.9	76.8	60.7	16.1
8	.072	.151	.020	.131	67.7	76.5	60.5	16.0
9	.047	.109	.007	.102	69.2	78.8	61.0	17.8
10	.049	.133	29.990	.143	70.5	78.3	63.8	14.5
11	.045	.122	.984	.138	69.9	77.9	64.6	13.3
12	.066	.149	30.009	.140	67.4	76.5	60.5	16.0
13	.057	.144	29.982	.162	68.2	76.8	60.2	16.6
14	.022	.098	.966	.132	69.1	78.0	61.0	17.0
15	.043	.111	30.003	.108	67.4	76.4	61.0	15.4
16	.068	.148	.018	.130	64.5	74.0	57.5	16.5
17	.069	.140	.016	.124	65.1	74.5	57.3	17.2
18	.052	.139	29.989	.150	65.5	74.5	58.5	16.0
19	.025	.086	.966	.120	64.2	73.5	56.4	17.1
20	.070	.155	30.022	.133	63.2	73.0	54.7	18.3
21	.050	.142	29.972	.170	62.4	72.3	53.9	18.4
22	.022	.102	.959	.143	61.9	71.0	54.2	16.8
23	.017	.095	.965	.130	63.6	74.7	55.5	19.2
24	.005	.082	.943	.139	65.1	76.0	56.3	19.7
25	29.949	.031	.882	.149	67.2	78.7	57.8	20.9
26	.928	29.990	.865	.125	68.6	79.0	61.0	18.0
27	.996	30.055	.959	.096	67.0	76.5	58.0	18.5
28	30.021	.088	.967	.121	67.7	76.0	61.0	15.0
29	.020	.104	.962	.142	68.3	78.2	59.5	18.7
30	.059	.132	.995	.137	68.7	79.3	60.5	18.8
31	.072	.157	30.019	.138	68.6	77.3	60.0	17.3

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	62.3	6.6	57.0	11.9	0.473	5.21	2.53	0.67
2	61.8	6.6	56.5	11.9	.465	.13	.49	.67
3	61.8	6.4	56.7	11.5	.469	.16	.42	.68
4	62.5	6.3	57.5	11.3	.481	.31	.40	.69
5	61.6	6.8	56.2	12.2	.461	.08	.54	.67
6	61.5	6.3	56.5	11.3	.465	.14	.34	.69
7	62.2	5.7	57.6	10.3	.483	.33	.18	.71
8	62.7	5.0	58.7	9.0	.501	.54	1.92	.74
9	63.5	5.7	58.9	10.3	.504	.56	2.25	.71
10	64.5	6.0	59.7	10.8	.518	.69	.44	.70
11	62.7	7.2	56.9	13.0	.472	.18	.80	.65
12	59.9	7.5	53.9	13.5	.426	4.71	.68	.64
13	61.6	6.6	56.3	11.9	.462	5.10	.48	.67
14	62.5	6.6	57.2	11.9	.476	.24	.54	.67
15	60.1	7.3	51.3	13.1	.432	4.78	.61	.65
16	57.5	7.0	51.9	12.6	.398	.43	.33	.66
17	58.8	6.3	53.8	11.3	.425	.72	.17	.69
18	59.0	6.5	53.8	11.7	.425	.71	.27	.68
19	56.1	8.1	48.8	15.4	.358	3.99	.70	.60
20	55.9	7.3	49.3	13.9	.365	4.06	.43	.63
21	55.6	6.8	49.5	12.9	.367	.10	.23	.65
22	55.9	6.0	50.5	11.4	.380	.25	1.98	.68
23	57.0	6.6	51.1	12.5	.388	.31	2.26	.66
24	58.8	6.3	53.8	11.3	.425	.72	.17	.69
25	60.7	6.5	55.5	11.7	.450	.98	.37	.68
26	62.9	5.7	58.3	10.3	.494	5.45	.22	.71
27	60.5	6.5	55.3	11.7	.447	4.95	.35	.68
28	60.1	7.6	54.0	13.7	.428	.72	.74	.63
29	61.3	7.0	55.7	12.6	.453	5.00	.60	.66
30	62.7	6.0	57.9	10.8	.488	.37	.32	.70
31	61.1	7.5	55.1	13.5	.444	4.90	.77	.64

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid- night.	30.040	30.093	29.900	0.193	63.5	68.5	58.4	10.1
1	.031	.082	.889	.193	62.8	68.0	57.2	10.8
2	.021	.070	.876	.194	62.2	67.5	56.4	11.1
3	.011	.060	.865	.195	61.5	67.0	56.2	10.8
4	.013	.052	.872	.180	60.9	66.4	56.0	10.4
5	.026	.063	.882	.181	60.3	65.8	55.5	10.3
6	.043	.084	.901	.183	59.7	65.0	54.0	11.0
7	.063	.105	.917	.188	59.5	64.6	53.9	10.7
8	.089	.131	.946	.185	61.5	65.6	55.0	10.6
9	.110	.154	.983	.171	65.4	70.5	58.5	12.0
10	.113	.157	.985	.172	69.1	74.2	62.2	12.0
11	.094	.144	.979	.165	72.0	75.6	65.4	10.2
Noon.	.060	.106	.946	.160	73.9	77.7	67.5	10.2
1	.027	.072	.924	.148	75.4	78.1	69.2	8.9
2	.003	.044	.912	.132	76.2	78.8	70.5	8.3
3	29.988	.030	.892	.138	76.2	79.3	71.0	8.3
4	.986	.023	.882	.141	75.0	78.0	70.0	8.0
5	.993	.033	.883	.150	73.4	76.0	68.5	7.5
6	30.006	.053	.885	.168	70.5	73.5	65.5	8.0
7	.022	.073	.905	.168	68.5	72.0	63.5	8.5
8	.039	.088	.926	.162	67.1	71.0	62.3	8.7
9	.050	.100	.931	.169	66.0	70.8	61.0	9.8
10	.057	.096	.931	.165	65.0	69.7	60.0	9.7
11	.050	.091	.928	.163	64.2	69.0	59.0	10.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	59.6	3.9	56.1	7.4	0.459	5.13	1.42	0.78
1	58.9	3.9	55.4	7.4	.449	.01	.40	.78
2	58.4	3.8	55.0	7.2	.442	4.95	.34	.79
3	57.9	3.6	54.7	6.8	.438	.90	.26	.80
4	57.4	3.5	54.2	6.7	.431	.82	.22	.80
5	56.9	3.4	53.8	6.5	.425	.76	.17	.80
6	56.4	3.3	53.4	6.3	.419	.71	.11	.81
7	56.3	3.2	53.4	6.1	.419	.71	.07	.82
8	57.5	4.0	53.9	7.6	.426	.77	.39	.77
9	59.3	6.1	54.4	11.0	.434	.80	2.15	.69
10	61.1	8.0	54.7	14.4	.438	.83	.95	.62
11	62.3	9.7	54.5	17.5	.435	.78	3.72	.56
Noon.	62.6	11.3	54.7	19.2	.438	.78	4.23	.53
1	63.1	12.3	54.5	20.9	.435	.73	.70	.50
2	63.4	12.8	54.4	21.8	.434	.70	.96	.49
3	63.3	12.9	54.3	21.9	.432	.69	.67	.49
4	62.7	12.3	54.1	20.9	.429	.68	.63	.50
5	63.4	10.0	55.4	18.0	.449	.90	3.97	.55
6	63.6	6.9	58.1	12.4	.491	5.40	2.73	.66
7	63.0	5.5	58.6	9.9	.499	.51	.14	.72
8	62.3	4.8	58.5	8.6	.498	.50	1.82	.75
9	61.5	4.5	57.9	8.1	.488	.40	.68	.76
10	60.6	4.4	57.1	7.9	.475	.27	.60	.77
11	60.1	4.1	56.4	7.8	.464	.16	.53	.77

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches		lb	Mile.	
1	124.5	...	N by W, N E & N	...	70.5	B to 5 A.M., \i to 8 A.M. B to 11 P.M. Slightly foggy at 8 & 9 P.M.
2	123.5	...	N & W N W	...	26.6	B to 6 A.M. \i to 9 A.M. B to 11 P.M.
3	124.0	...	WNW & NNW	...	40.3	B.
4	128.0	...	N N W	...	56.0	B.
5	127.0	...	NNW & WNW	...	56.7	B.
6	125.0	...	W S W & N W	...	36.5	B. Foggy from midnight to 2 A.M. & 8 to 11 P.M.
7	130.5	...	N W & N	...	37.4	B to Noon, \i to 6 P.M. B to 11 P.M. Foggy from Midnight to 3 A.M. & 6 to 11 P.M.
8	125.0	...	N by W & N by E	...	40.2	B to 6 A.M., \i to 6 P.M. B to 11 P.M. Slightly foggy from Midnight to 6 A.M.
9	123.5	...	N by E	...	39.9	B to 3 A.M., \i to 10 A.M., \i to 1 P.M., \i to 4 P.M., \i to 6 P.M. B to 11 P.M. Slightly foggy from 1 to 3 A.M. & 7 to 11 P.M.
10	127.0	...	N by E	...	59.0	B to 1 A.M., \i to 6 A.M., \i to 6 P.M. B to 11 P.M. Slightly foggy at Midnight & 1 A.M.
11	120.5	...	N by E & N	0.2	126.3	B to 4 A.M. S to 7 A.M., \i to Noon B to 11 P.M. Foggy from 8 to 11 P.M.
12	126.4	...	N & N by W	...	104.5	B to 7 A.M., \i to 4 P.M. B to 11 P.M. Slightly foggy at 7 & 8 P.M.
13	125.0	...	N & N by E	...	129.2	B to 4 A.M., \i to 11 A.M. B to 2 P.M., \i to 6 P.M. B to 11 P.M.
14	125.0	...	N by W & N by E	...	190.2	B to 5 A.M., \i & \i to 10 A.M. B to 11 P.M.
15	125.8	...	N by E & N	...	179.5	B to 5 A.M., \i to 11 to A.M. B to 11 P.M.
16	116.0	...	N N E & W N W	...	146.5	B. Slightly foggy at 5 & 6 A.M.
17	121.0	...	N W & N by W	...	133.3	Chiefly B.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,  
\i Cirro, cumuli-B clear, S strati, O overcast, T thunder, L lightning,  
R. rain, D, drizzle.



*Meteorological Observations.*

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of December 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Mies.	
18	127.5	...	N by W	...	139.8	B to 1 P. M., \i to 11 P. M.
19	127.8	...	N by W & N	...	121.5	\i to 2 A. M. B to 2 P. M., \i & \i to 11 P. M. Slightly foggy from 8 to 10 P. M.
20	124.0	...	N by E, N & NNW	...	145.5	\i. Slightly foggy at 8 & 9 P. M.
21	123.2	...	N by W, NNW & N [W	...	138.7	B to 5 A. M., \i to 7 A. M. B to 2 P. M., \i to 6 P. M. B to 11 P. M. Slightly foggy at 8 & 9 P. M.
22	123.0	...	N W & N N W	...	72.9	B. Foggy from 7 to 11 P. M.
23	131.5	...	N W	...	76.2	B to 5 A. M., \i to 8 A. M. B to Noon, \i to 6 P. M. B to 11 P. M. Foggy from Midnight to 5 A. M., & 8 to 11 P. M.
24	120.0	...	W N W [S W	...	76.6	B. Foggy at Midnight & 1 A. M. & from 7 to 11 P. M.
25	133.0	...	WNW, WSW &	...	64.1	B to 2 A. M., \i to 7 A. M., \i to 10 A. M. B to 3 P. M., \i to 5 P. M. B to 11 P. M. Foggy from Midnight to 7 A. M.
26	132.5	...	S W & W N W	...	86.0	B to 9 P. M., \i to 11 P. M. Slightly foggy from 7 to 9 P. M.
27	125.0	...	N by E & N	...	151.1	\i to 1 A. M. B to 9 A. M., \i to Noon B to 7 P. M. \i to 11 P. M.
28	126.3	...	N & N N W [N	...	92.4	\i to 7 A. M. B to 11 A. M., \i to 5 P. M. B to 11 P. M. Slightly foggy at 9 & 10 P. M.
29	130.0	...	WSW, SW & W by	...	63.4	\i to 2 A. M. B to Noon \i to 3 P. M. B to 11 P. M. Slightly foggy from 7 to 9 P. M.
30	134.0	...	W by S & W S W	...	59.0	B. Slightly foggy from 6 to 9 A. M. & 8 to 11 P. M.
31	132.0	...	W by N & N W	...	76.8	B.

\i Cirri,—i Strati, ^i Cumuli, \i Cirro-strati, ^i Cumulo-strati, \i Nimbi,  
\i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning  
R. rain, D. drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1874.*

MONTHLY RESULTS.

---

	Inches.
Mean height of the Barometer for the month ... ..	30.039
Max. height of the Barometer occurred at 10 A. M. on the 31st ...	30.157
Min. height of the Barometer occurred at 3 A. M. on the 26th ...	29.865
Extreme range of the Barometer during the month ...	0.292
Mean of the daily Max. Pressures ... ..	30.115
Ditto ditto Min. ditto ... ..	29.983
Mean daily range of the Barometer during the month ...	0.132

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	°
Mean Dry Bulb Thermometer for the month ... ..	67.1
Max. Temperature occurred at 3 P. M. on the 30th ...	79.3
Min. Temperature occurred at 7 A. M. on the 21st ...	53.9
Extreme range of the Temperature during the month ...	25.4
Mean of the daily Max. Temperature ... ..	76.4
Ditto ditto Min. ditto, ... ..	59.4
Mean daily range of the Temperature during the month ...	17.0

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Mean Wet Bulb Thermometer for the month ... ..	60.5
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	6.6
Computed Mean Dew-point for the month ... ..	55.2
Mean Dry Bulb Thermometer above computed mean Dew-point	11.9

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.445

---

	Troy grain.
Mean Weight of Vapour for the month ... ..	4.93
Additional Weight of Vapour required for complete saturation ...	2.39
Mean degree of humidity for the month, complete saturation being unity	0.67

	°
Mean Max. Solar radiation Thermometer for the month ... ..	126.0

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	Inches.
Rained no days,—Max. fall of rain during 24 hours ... ..	Nil.
Total amount of rain during the month ... ..	Nil.
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	Nil.
Prevailing direction of the Wind ... N., N. W. & N. by E.	

\* Height 70 feet 10 inches above ground.



Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]



APPENDIX.

LIST OF MEMBERS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
ON THE 31ST DECEMBER, 1873.



## LIST OF ORDINARY MEMBERS.

The \* distinguishes Non-Subscribing, the † Non-Resident Members,  
and the ‡ Life-Members.

N. B.—Gentlemen who may have changed their residence, since this list was drawn up, are requested to give intimation of such a change to the *Secretaries*, in order that the necessary alterations may be made in the subsequent edition. Errors or omissions in the following list should also be communicated to the *Secretaries*.

Gentlemen who are proceeding to Europe, with the intention of not returning to India, are particularly requested to notify to the *Secretaries*, whether it be their desire to continue as members of the Society, otherwise, in accordance with rule 14 B. of the Bye-laws, their names will be removed from the list at the expiration of three years from the time of their leaving India.

Date of Election.			
1860 Dec.	5.	Abdullatif Khán Bahádur, The Hon., Maulavi.	Calcutta
1868 Sept.	2.	†Adam, R. M., Esq.	Sambhar Lake viá Jaipur
1860 July	4.	†Ahmad Khan, Sayyid, Bahádur.	Benares
1872 April	3.	†Ahsanullah, Khwajah.	Dacca
1860 April	4.	†Aitchison, J. E. T., Esq., M. D.	Mari, Panjáb
1866 Jan.	17.	*Allan, Lieut.-Col. A. S.	Europe
1871 June	7.	†Alexander, J. W., Esq.	Benares
1860 Oct.	3.	Amír Alí Khan Bahádur, Munshí.	Calcutta
1865 Jan.	11.	*Anderson, Dr. J., F. L. S.	Europe
1872 June	5.	†Anderson, A., Esq.	Futtehghur
1871 Sept.	6.	†Atkinson, E. T., Esq., C. S.	Nynce Tal
1855 July	4.	Atkinson, W. S., Esq., M. A., F. L. S.	Calcutta
1869 Feb.	3.	†Attar Singh Bahádur, Sirdár.	Loodiana
1870 Feb.	2.	Baden-Powell, H., Esq., C. S.	Calcutta
1873 Aug.	6.	†Badgley, Capt. W. F.	Shillong
1859 Aug.	3.	Baláichánd Sinha, Bábu.	Calcutta
1865 Nov.	7.	†Ball, V., Esq., Geol. Survey.	Geol. S. Office
1860 Nov.	1.	Banerjea, Rev. K. M.	Calcutta
1869 Dec.	1.	†Barker, R. A., Esq., M. D.	Beerbhoom
1873 March	5.	Barclay, G. W. W., Esq., M. A.	Calcutta
1873 Jan.	8.	Bate, Rev. J. D.	Allahabad
1860 July	4.	†Batten, G. K. M., Esq., C. S.	Agra
1859 May	4.	Bayley, E. C., The Hon'ble., B. C. S., C. S. I.	Calcutta
1861 Feb.	6.	†Bayley, S. C., Esq., B. C. S.	Patna
1873 Feb.	5.	Bayne, R. R., Esq., B. A.	Calcutta
1864 Sept.	7.	†Beames, J., Esq., B. C. S.	Cuttack
1841 April	7.	Beaufort, F. L., The Hon. B. C. S.	Calcutta



Date of Election.		
1867 July 3.	Belletty, N. A., Esq.	Calcutta
1869 Jan. 20.	†Bellew, Dr. P. F.	Bombay Mint
1871 March 1.	Benedict, E., Esq., C. E., M. Inst. C. E.	Calcutta
1862 Oct. 8.	Bernard, C. E., The Hon., B. C. S.	Calcutta
1872 Aug. 7.	*Beverly, H., Esq., C. S.	Europe
1862 June 4.	†Bhau Daji, Dr.	Bombay
1864 Nov. 2.	Bhudeva Mukerjea, Bábu.	Chinsurah
1873 Aug. 6.	†Bingham, Lieut. C. T.	Allahabad
1872 Nov. 6.	Bisset, Lieut. W. S. S., R. E.	Calcutta
1873 Dec. 3.	Blackburn, J., Esq.	Calcutta
1857 Mar. 4.	Blanford, H. F., Esq., A. R. S. M., F. G. S.	Calcutta
1859 Aug. 3.	*Blanford, W. T., Esq., A. R. S. M., F. G. S.	Europe
1873 Aug. 6.	Bligh, W. G., Esq.	Muttra
1873 April 2.	Blisset, T. T., Esq.	Calcutta
1864 April 6.	Blochmann, H., Esq., M. A.	Calcutta
1871 April 5.	†Bourne, T. W., Esq.	Central Provinces
1871 April 5.	†Bourne, Walter, Esq., C. E.	Madapur
1868 Jan. 15.	Boxwell, J., Esq., C. S.	Serampore
1872 June 5.	†Brooks, W. E., Esq., C. E.	Khugoul
1871 Jan. 4.	Brough, R. S., Esq.	Calcutta
1866 Jan. 17.	†Brown, Col. D.	Moulmein
1866 Nov. 7.	†Browne, Lieut.-Col. Horace A.	Thayetmyo
1866 June 6.	†Brownfield, C., Esq.	Kamrup
1868 June 3.	†Buck, E. C., Esq., C. S.	Cawnpore
1871 July 5.	Buckland, C. T., Esq., C. S.	Hughli
1866 June 6.	Buckle, Dr. H. B., C. B.	Calcutta
1871 Sept. 6.	†Buckle, H., Esq.	Akyab
1872 Jan. 3.	*Butcher, W. D., Esq., M. R. C. S.	Europe
1873 Aug. 6.	†Butler, Capt., J.	Samaguting, Na- ga Hills
1869 Jan. 20.	†Cadell, A., Esq., B. A., C. S.	Muzaffarnagar
1863 June 3.	Campbell, The Hon'ble Sir G., K. C. S. I.	Calcutta
1873 March 5.	Cappel, A., Esq.	Calcutta
1860 Jan. 3.	†Carnac, J. H. Rivett, Esq., B. C. S.	Allahabad
1868 Aug. 5.	†Chandramohan, Gosvámi, Pandit.	Gowhatty
1863 Aug. 5.	†Chandranáth Ráy, Rájá.	Nator
1872 Dec. 4.	†Chard, Rev. C. H.	Thayetmyo
1871 Sept. 6.	†Chisholm, R. F., Esq.	Madras
1868 Feb. 5.	†Clark, Major E. G., Bengal Staff Corps.	Kheree, Oudh
1871 March 1.	Clarke, C. B., Esq.	Calcutta
1872 Aug. 7.	†Clutterbuck, Capt. F. St. Quintin.	Attock
1871 Oct. 4.	*Cooke, H. G., Esq., C. S.	Europe
1868 Dec. 2.	†Cooke, J. E., Esq.	Haidarabad
1872 June 5.	*Court, Major M. H.	Europe
1873 Aug. 6.	Cunningham, D. D., Esq., M. B.	Calcutta
1847 June 2.	†Dalton, Col. E. T., C. S. I., Staff Corps.	Chota Nagpore
1870 May 4.	†Damant, G. H., Esq., C. S.	Dinajpur



Date of Election.		
1861 Nov.	6.	†Davies, The Hon'ble R. H., C.S. I., B. C. S.
1869 April	7.	†Day, Dr. F., F. L. S., F. Z. S.
1856 June	4.	†DeBourbel, Major R., Royal Engrs.
1870 Feb.	2.	†DeFabeck, F. W. A., Esq., I. M. Service.
1872 Aug.	7.	Dejoux, P., Esq.
1869 Oct.	6.	†Delmerick, J. G., Esq.
1873 Jan.	8.	†Dennys, H. L., Esq.
1864 July	6.	Devendra Mallik, Bábu.
1862 May	7.	†Dhanapati Singh Dughar, Ráy, Bahádur.
1853 Sept.	7.	Dickens, Col. C. H., C. S. I.
1870 May	4.	*Dobson, G. E., Esq., B. A., M. B.
1859 Sept.	7.	*Douglas, Col. C.
1869 Feb.	3.	*Drew, F., Esq.
1870 March	8.	†Duke of Edinburgh, His Royal Highness.
1873 July	2.	†Durand, H. M., Esq., C. S.
1867 June	5.	†Duthoit, W., Esq., C. S.
1871 March	1.	Dvijendranath Thakur, Babu.
1868 Oct.	7.	*Eddowes, W., Esq., M. D.
1863 May	6.	†Edgar, J. W., Esq., B. C. S.
1871 Dec.	2.	†Elliot, J., Esq., M. A.
1846 Jan.	7.	*Elliot, Sir Walter, late M. C. S.
1859 Nov.	2.	†Elliot, C. A., Esq., B. C. S.
1871 Oct.	4.	†Evezard, Col. G. E.
1863 Oct.	7.	Ewart, J., Esq., M. D.
1859 Dec.	7.	Fath Ali, Maulavi.
1851 May	7.	*Fayrer, Dr. J., C. S. I.
1863 Jan.	15.	†Fedden, Francis, Esq., Geol. Survey.
1868 May	6.	Field, C. D., Esq., M. A., C. S.
1869 Sept.	1.	†Fisher, J. H., Esq., C. S.
1872 Dec.	4.	†Forbes, Major, J. G., R. E.
1861 Feb.	6.	†Forest, R., Esq., Civil Engineer.
1869 Oct.	12.	†Forlong, Lieut.-Col. J. G. R., M. S. C.
1863 June	3.	†Forsyth, T. D., Esq., C. B.
1871 Nov.	1.	†Foster, J. M., Esq., M. R. C. P.
1873 July	2.	Fraser, Capt. E.
1869 Sept.	1.	†Fryer, Capt. G. E., Dy. Commissioner.
1867 Sept.	4.	Fyfe, The Rev. W. C.
1873 Dec.	3.	†Gamble, J. S., Esq.
1871 June	7.	Gangaprasad Sinha, Babu.
1871 Aug.	2.	†Gangaprasad, Munshi.
1859 Aug.	3.	Gastrell, Col. J. E., Supdt. Rev. Survey.
1862 Feb.	5.	†Gauradás Baisák, Bábu.
1867 Sept.	4.	†Gauvain, Capt. V.
1867 Dec.	4.	Gay, E., Esq., M. A.
		Lahore
		India
		Oudh
		Jaipur
		Calcutta
		Delhi
		Nagpur
		Calcutta
		Azimganj
		Calcutta
		Europe
		Europe
		Europe
		Europe
		Bhágampur
		Ghazee-pore
		Calcutta
		Erinpura
		Darjeeling
		Allahabad, Muir
		Central College.
		Europe
		Allahabad
		Poona
		Calcutta
		Calcutta
		Europe
		Geol. S. Office
		Calcutta
		Raipore
		Lucknow
		Dehra
		Lucknow
		Kashghar
		Nazira, Assam
		Calcutta
		Sandoway, Arra-
		kan
		Calcutta
		Silligoree
		Calcutta
		Moradabad
		Calcutta
		Jehanabad
		Calcutta
		Calcutta



Date of Election.		
1859 Sept. 7.	Geoghegan, J., Esq., B. C. S.	Calcutta
1869 Feb. 3.	†Giriprasād Sing, Thákur.	Allighur
1861 Feb. 6.	*Godwin-Austen, Major H. H., Topographical Survey.	Europe
1869 Oct. 6.	†Gomes, A. D. B., Esq.	Sunderbuns
1872 Nov. 6.	*Gordon, C. B. P., Esq.	Europe
1862 July 2.	†Gordon, J. D., Esq., C. S. I., C. S.	Mysore
1869 July 7.	†Gordon, Robert, Esq., C. E.	Henzaday
1871 March 1.	†Govindacumar, Chaudhuri.	Dacca
1863 Nov. 4.	†Gowan, Lieut.-Col. J. Y.	Allahabad
1866 June 6.	Gribble, T. W., Esq., B. C. S.	Calcutta
1861 Sept. 4.	†Griffin, L. H., Esq., B. C. S.	Lahore
1873 Aug. 6.	Garisichandra Sinha, Kumara.	Calcutta
1861 Feb. 6.	†Growse, F. S., Esq., M. A., B. C. S.	Muttra
1871 Jan. 4.	Gunendranath Thakur, Babu.	Calcutta
1864 Dec. 5.	†Gurucharan Dás, Bábu.	Backergungo
1871 June 7.	Habiburrahman, Maulavi.	Calcutta
1867 July 3.	†Hacket, C. A., Esq., Geol. Survey.	Geol. S. Office
1869 April 3.	†Hæberlin, The Rev. C.	Ranchee
1866 Jan. 17.	†Hamilton, Lieut.-Col. T. C.	British Burmah, Rangoon
1855 March 7.	†Hamilton, R., Esq.	Wardah
1871 July 5.	Hamilton, Col. O.	Calcutta
1861 March 1.	†Harachandra Chaudhuri, Babu.	Mymensing
1866 Nov. 1.	Harendra Krishna Bahádur, Kumár.	Calcutta
1871 Feb. 1.	†Harkness, T. F., Esq., C. S.	Azingarh
1861 Feb. 2.	†Harrison, A. S., Esq., B. A.	Muir's College, Allahabad
1859 Oct. 12.	*Haughton, Col. J. C., C. S. I.	Europe
1873 May 7.	Hector, Rev. John M. A.	Calcutta
1862 Aug. 7.	Heeley, W. L., Esq., B. A., C. S.	Calcutta
1872 May 1.	Heilgers, W., Esq.	Calcutta
1853 July 6.	*Herschel, Sir W. J., Bart., B. C. S.	Europe
1868 Aug. 5.	†Hobart, R. T., Esq., C. S.	Etah
1872 Nov. 6.	†Holcombe, Lieut. W. A.	Assam
1872 Dec. 4.	†Hoernle, Rev. A. F. R., Ph. D.	Benares
1868 Nov. 4.	*Holroyd, Capt. W. R. M.	Europe
1873 Jan. 8.	†Houston, G. L., Esq.	JohnstoneCastle, Renfrewshire
1863 Jan. 15.	†Howell, M. S., Esq., C. S.	Benares
1871 April 5.	Howell, A. P., Esq., C. S.	Calcutta
1866 Feb. 7.	Hoyle, G. W. Esq.	Calcutta
1867 Aug. 7.	†Hughes, T. H., Esq., A. R. S. M., F. G. S. Geol. Survey of India.	Geol. S. Office
1873 March 5.	*Hughes, A. J., Esq., C. E.	Europe
1866 Jan. 17.	†Hughes, Captain W. G., M. S. C.	Arracan
1870 Jan. 5.	Hume, Allan O., Esq., C. B., C. S.	Calcutta
1870 June 1.	Hunter, W. W., Esq., LL. D., C. S.	Calcutta



Date of Election.		
1868 April 1.	Hyde, Lieut.-Col. H., R. E.	Calcutta
1872 Dec. 4.	†Ibbetson, D. C. J., Esq., C. S.	Karnál, Panjáb
1866 March 7.	*Irvine, W., Esq., C. S.	Europe
1871 March 8.	Isaac, T. S., Esq., C. E.	Calcutta
1853 Dec. 7.	†Isvaríprasád Singh Bahádur, Raja.	Benares
1865 June 7.	†Jaykissen Dás Bahádur, Rájá, C. S. I.	Allighur
1873 Aug. 6.	Jogesachandra Datta, Babu.	Calcutta
1866 Feb. 7.	†Johnson, W. H., Esq.	Sialkote
1862 March 5.	†Johnstone, Major J. W. H., Dy. Commis- sioner.	Bannu, Panjáb
1867 Dec. 4.	*Johnstone, Capt. J.	Europe
1873 Dec. 3.	†Johor, H. H., Maharaja of, K. C. S. I., K. C. C. I.	New Johor, near Singapore
1873 April 2.	Jones, F., Esq.	Calcutta
1869 April 7.	Kabíruddín Ahmad, Maulavi.	Calcutta
1871 May 3.	Kaliprasanna Ghosh, Babu.	Calcutta
1861 Dec. 4.	†Kempson, M. Esq., M. A.	Bareilly
1867 Dec. 4.	King, G., Esq., M. B.	Calcutta
1867 March 6.	†King, Capt. H. W.	P. & O Co.'s Office
1862 Jan. 15.	†King, W., Jr., Esq., Geol. Survey of India.	Geol. Surv. Office
1867 March 6.	†Knox, G. E., Esq., C. S.	Allahabad
1860 May 5.	Kurz, S., Esq.	Calcutta
1868 Feb. 5.	*Lees, L. H., Esq., M. D.	Europe
1859 Dec. 7.	†Leonard, H., Esq., M. A., C. E.	Panjáb
1870 July 6.	Lethbridge, E., Esq., M. A.	Calcutta
1869 June 2.	*Leupolt, J. C., Esq., C. S.	Europe
1873 Feb. 5.	Lewis, T. R., Esq., M. B.	Calcutta
1864 Nov. 2.	Locke, H. H., Esq.	Calcutta
1869 April 7.	†Lockwood, E. D., Esq., C. S.	Monghyr
1866 Jan. 17.	†Low, J., Esq., G. T. S.	Almora
1869 July 7.	Lyall, C. J., Esq., B. A., C. S.	Calcutta
1870 April 6.	†Lyman, B. Smith, Esq.	Japan
1866 June 6.	*Macdonald, Major J., Staff Corps.	Europe
1873 May 7.	†Mackay, W., Esq., C. E.	Port Blair
1873 Dec. 3.	McLeod, K., Esq., M. D.	Calcutta
1848 April 5.	†Maclagan, Col. R., R.E., F.R.S.E., F.R.G.S.	Lahore
1867 July 3.	Macnamara, Dr. C.	Calcutta
1870 May 4.	†Macnaghten, C., Esq.	Rajkote College, Kattywar
1867 April 3.	Mahendralál Sircár, Dr.	Calcutta
1867 April 3.	†Mainwaring, Lieut.-Col. G. B.	Calcutta
1862 Sept. 3.	†Mallet, F. R., Esq., Geol. Survey.	Geol. S. Office
1852 Nov. 3.	Manickjee Rustamjee, Esq.	Calcutta
1872 Nov. 6.	†Man, E. H., Esq.	Port Blair



Date of Election.		
1869 July 7.	†Markham, A. M., Esq., C. S.	Bijnour
1873 July 2.	†Marshall, C. W., Esq.	Berhampore
1873 Aug. 6.	†Marshall, Lieut.-Col. W. E.	Mussooree
1860 March 7.	Medlicott, H. B., Esq., F. G. S., Geol. Survey of India.	Calcutta.
1871 Sept. 6.	†Miles, Capt. S. B.	Bombay
1870 July 6.	Miller, A. B., Esq.	Calcutta
1867 June 5.	Milman, R., D. D., The Right Rev. Lord Bishop of Calcutta.	Calcutta
1867 March 6.	*Montgomerie, Major T. G., R. E.	Europe
1854 Dec. 6.	Morris, G. G., The Hon'ble B. C. S.	Calcutta
1854 Oct. 11.	†Muir, Sir W., K. C. S. I., B. C. S.	Allahabad
1862 July 2.	†Napier of Magdala, Lord R., General G. C. S. I., G. C. B.	Simla
1869 May 5.	Nevill, G. Esq., C. M. Z. S.	Calcutta
1865 Feb. 1.	†Newal Kishwar, Munshi.	Lucknow
1871 Jan. 4.	*Newton, Isaac, Esq.	Europe
1872 May 1.	†Niranjan Mukerji, Babu.	Benares
1869 July 7.	†Nursing Rao, A. V., Esq.	Vizagapatam
1871 July 5.	†Oates, E. W., Esq., C. E.	Thayetmyo
1851 June 4.	*Oldham, T., Esq., LL.D., F. R. S.	Europe
1873 Aug. 6.	Olpherts, W. J., Esq.	Calcutta
1864 Mar. 2.	Palmer, Dr. W. J.	Calcutta
1873 Aug. 6.	Parker, J. C., Esq.	Calcutta
1862 May 7.	Partridge, S. B., Esq., M. D.	Calcutta
1871 Dec. 6.	†Peal, S. E., Esq.	Sibsagar, Assam
1867 Mar. 6.	Pearimohan Mukarji, M. A., Babu.	Uttarparrah
1860 Feb. 1.	*Pearse, Lieut.-Col. G. G.	Europe
1868 Nov. 4.	†Pearson, C. E., Esq., M. A.	Lahore
1873 Aug. 6.	Pedler, A., Esq.	Calcutta
1869 July 7.	Pell, S. Esq.,	Calcutta
1864 Mar. 2.	Pellew, F. H., Esq., C. S.	Hooghly
1865 Sept. 6.	†Peppé, J. H., Esq.	Ranchi
1868 May 6.	Peterson, F. W., Esq.	Calcutta
1835 July 1.	†Phayre, Major G., Sir A. P., K. C. S. I., C. B.	Europe
1864 Nov. 2.	Phear, The Hon'ble J. B.	Calcutta
1869 Feb. 3.	†Pickford, J., Esq., M. A.	Madras
1868 April 1.	†Pramathanáth Ráy, Kumár.	Digapati
1872 Dec. 4.	Prananath Pandit, Babu.	Bhawánipur
1869 Feb. 3.	Pratápachandra Ghosha, B. A.	Calcutta
1871 June 7.	†Pratt, Capt. C. S., Staff-Corps.	Morar, Gwalior
1862 Oct. 8.	†Pulinavihari Sen, Babú.	Berhampore
1856 Mar. 5.	Rájendralála Mitra, Bábu.	Calcutta
1871 June 7.	Rámakrishna Dás, Bábu.	Calcutta
1837 Feb. 1.	Ramánáth Tákur, The Hon'ble Raja.	Calcutta



Date of Election.		
1860 Mar.	7. †Reid, H. S., Esq., C. S.	Allahabad
1871 July	5. †Reid, J. R., Esq., C. S.	Azimgur
1872 April	3. Richards, Dr. V.	Calcutta
1868 April	1. Robb, G., Esq.	Calcutta
1863 April	1. †Robertson, C., Esq., C. S.	Mirzapur
1865 Feb.	1. Robinson, S. H., Esq.	Calcutta
1870 Dec.	7. Rogers, A., Esq.	Calcutta
1869 July	7. †Ross, Lieut. J. C., R. E.	Boolundshuhur
1870 Jan.	5. †Ross, Alexander G., Capt. Staff Corps.	Edwardesabad
1871 Sept.	5. Rundall, Col. F. H., R. E.	Calcutta
1871 Dec.	6. †Samuells, Capt. W. L.	Hazareebagh
1871 May	3. Sanderson, C., Esq.	Calcutta
1872 Feb.	7. †Sashagiri Sastri, M. B. A.	Madras
1870 May	4. Satyánand Ghoshál, Rája.	Calcutta
1873 Jan.	8. Schlegel, F., Esq.	Calcutta
1870 May	4. Schlich, Dr. W.	Calcutta
1869 Feb.	3. Schwendler, L., Esq.	Calcutta
1860 July	4. †Shelverton, G., Esq.	Waltair, near Vizagapatam
1863 April	1. †Showers, Lieut.-Col. C. L.	Umballa
1866 June	6. †Sime, J., Esq., B. A.	Delhi
1872 Aug.	7. *Skrefsrud, Rev. L. O.	Europe
1864 Sept.	7. †Sladen, Major E. B.	Amherst
1865 July.	5. Smith, D. Boyes, Esq. M. D.	Calcutta
1864 Mar.	2. †Spearman, Capt. H. R.	Rangoon
1867 May	1. †Steel, Capt. E. H., R. A.	Murree
1872 July	3. †Stephen, Carr, Esq.	Jalandhar
1863 Sept.	2. †Stewart, R. D., Esq.	Serajgunj
1870 April	6. Stewart, R., Esq.	Calcutta
1870 Sept.	7. †St. John, R. T., Esq.	Bassein
1861 Sept.	4. Stokes, Whitley, Esq.	Calcutta
1863 Nov.	4. †Stoliczka, F., Esq., Ph. D., F. G. S.	Yarkand
1869 Feb.	3. *Strachey, The Hon'ble Sir J., K. C. S. I.	Europe
1859 Mar.	2. †Stubbs, Major F. W., Royal Artillery.	Lucknow
1858 July	7. †Sutherland, H. C., Esq., B. C. S.	Sylhet
1872 Dec.	4. †Swetenham, Capt. E.	Prome
1864 Aug.	11. Swinhoe, W., Esq.	Calcutta
1863 Sept.	3. Syámácharan Sarcár, Bábu.	Calcutta
1865 Sept.	6. Tawney, C. H., Esq., M. A.	Calcutta
1865 April	5. Taylor, R., Esq.	Calcutta
1860 May	2. Temple, The Hon'ble Sir R., K.C.S.I., B.C.S.	Calcutta
1859 Mar.	2. †Theobald, W., Esq., Geological Survey.	Saharanpur
1869 Oct.	6. †Thomson, A., Esq.	Faizabad
1847 June	2. Thuillier, Col. H. L., R. A., F. R. S., C. S. I.	Calcutta
1865 July	5. †Tolbort, T. W. H., Esq., C. S.	Bunnoo
1871 April	5. *Treffitz, Oscar, Esq.	Europe
1861 June	5. †Tremlett, J. D., Esq., M. A., C. S.	Moozuffargarh



Date of Election.		
1872 July	3. Trevor, W. S., Major R. E.	Calcutta
1873 April	2. Turnbull, R., Esq.	Calcutta
1861 Sept.	4. Tween, A., Esq., Geological Survey.	Calcutta
1863 May	6. *Tyler, Dr. J.	Europe
1869 June	2. †Udayachánd Datt, Bábu.	Nowakhali
1873 April	2. Umesh Chunder Dutt, Bábu.	Calcutta
1873 May	7. †Urmston, H. B., Esq.	Rawul Pindi, Panjab
1860 May	2. *Vanrenen, Major A. D., Bengal Staff Corps.	Europe
1864 Feb.	3. †Verchère, A. M., Esq., M. D.	Benares
1864 April	6. Vijayarāma Gujapati Rāj Munniá Sultán Bahádur, Mahārājah Mirza.	Calcutta
1870 June	1. †Vrindāvanachandra Mandala, Bábu.	Balasore
1871 Feb.	1. †Waagen, Dr. W.	Europe
1873 Jan.	8. *Wace, Lieut. R.	Europe
1869 Aug.	4. Wáhid Alí, Prince Jahán Qadr Muhammad Bahádur.	Garden Reach
1865 Nov.	1. Waldie, D., Esq., F. G. S.	Calcutta
1861 May	1. †Walker, Col. J. T., R. E., F. R. S.	Dehra Doon
1863 Oct.	7. Waller, W. K., Esq., M. B.	Calcutta
1862 Jan.	15. †Ward, G. E. Esq., C. S.	Futtehgarh
1865 May	3. Waterhouse, Capt. J., B. S. C.	Calcutta
1869 Sept.	1. †Westland, J., Esq., C. S.	Nagpur
1867 Feb.	6. †Westmacott, E. V., Esq., B. A., C. S.	Rajmahall.
1862 Oct.	8. *Wheeler, J. T., Esq.	Europe
1873 April	2. †White, E., Esq., C. E.	Bijnour
1867 Aug.	7. †Wilcox, F., Esq.	Purulia
1873 Jan.	8. †Williams, H. C., Esq.	Centl. Provinces
1873 May	7. †Williams, G. R. C., Esq., C. S.	Muzúffergarh
1867 Jan.	16. †Williamson, Lieut. W. J.	Garo Hills
1867 Mar.	6. †Willson, W. G., Esq., B. A.	Calcutta
1871 Mar.	1. Willson, James, Esq., B. A.	Dacca
1870 Aug.	3. Wilson, R. H., Esq., C. S.	Calcutta
1866 Mar.	7. †Wise, Dr. J. F. N.	Dacca
1867 July	3. †Wood, Dr. J. J.	Ranchi
1870 Jan.	5. Wood-Mason, J., Indian Museum.	Calcutta
1873 Aug.	6. †Woodthorpe, Lieut. R. G., R. E.	Shillong
1869 Sept.	1. Yadulál Mallik, Bábu.	Calcutta
1868 June	3. Yatandramohan Tagore, Rajah Bahádur.	Calcutta
1867 Mar.	6. †Yogendranáth Mallik, Bábu.	Andul
1862	*Yule, Col. H. R. E.	Europe



### HONORARY MEMBERS.

Date of Election.			
1825 Mar.	9.	M. Garcin de Tassy, Memb. de l'Institut.	Paris
1821 "	6.	Sir John Phillippart.	London
1826 July	1.	Count de Noe.	Paris
1831 "	7.	Prof. C. Lassen.	Bonn
1835 May	6.	Prof. Lea.	Philadelphia
1842 Feb.	4.	Dr. Ewald.	Göttingen
1842 "	4.	Right Hon'ble Sir Edward Ryan, Kt.	London
1843 Mar.	30.	Prof. Jules Mohl, Memb. de l'Institut.	Paris
1847 Sept.	1.	Col. W. Munro.	London
1847 Nov.	3.	His Highness the Nawab Nazim of Bengal.	Murshidabad
1848 Feb.	2.	Dr. J. D. Hooker.	Kew
1848 Mar.	8.	Prof. Henry.	Princeton U. S.
1853 April	6.	Major-Gen. Sir H. C. Rawlinson, K. C. B.	London
1858 July	6.	B. H. Hodgson.	Europe
1859 Mar.	2.	The Hon'ble Sir J. W. Colville, Kt.	Europe
1860 Mar.	7.	Prof. Max Müller.	Oxford
1860 Nov.	7.	Mons. Stanislas Julien.	Paris
1860 "	7.	Dr. Robert Wight.	London
1860 "	7.	Edward Thomas.	London
1860 "	7.	Dr. Aloys Sprenger.	Bern
1860 "	7.	Dr. Albrecht Weber.	Berlin
1868 Feb.	5.	Genl. A. Cunningham, C. S. I.	India
1868 "	5.	Prof. Bāpu Déva Sāstri.	Benares
1868 "	5.	Dr. T. Thomson.	London
1868 "	2.	A. Grote.	London
1871 "	7.	Charles Darwin.	London
1872 "	1.	Sir G. B. Airy.	London
1872 June	5.	Prof. T. H. Huxley.	London

### CORRESPONDING MEMBERS.

1844 Oct.	2.	Macgowan, Dr. J.	Europe
1856 June	4.	Krämer, Herr A. von.	Alexandria
1856 "	3.	Porter, Rev. J.	Damascus
1856 "	4.	Schlagintweit, Herr H. von.	Munich
1856 "	4.	Smith, Dr. E.	Beyrout
1859 "	4.	Taylor, J., Esq.	Bussorah
1856 "	4.	Wilson, Dr.	Bombay
1857 Mar.	4.	Neitner, J., Esq.	Ceylon
1858 Mar.	3.	Schlagintweit, Herr R. von.	Giesen
1859 Nov.	2.	Frederick, Dr. H.	Batavia
1859 May	4.	Bleeker, Dr. H.	Europe
1860 Feb.	1.	Baker The Rev H.	E. Malabar
1860 "	1.	Swinhoe, R., Esq., H. M.'s Consul.	Amoy
1860 April	4.	Haug, Dr. M.	Munich
1861 July	3.	Gösche, Dr. R.	Berlin
1862 Mar.	5.	Murray, A., Esq.	London
1863 July	4.	Barnes, R. H., Esq.	Ceylon
1866 May	7.	Schlagintweit, Prof. E. von.	Munich
1866 "	7.	Sherring, Rev. M. A.	Benares
1868 Feb.	5.	Foucaux, M. F. H.	Paris
1868 "	5.	Holmböe, Prof.	Christiana



## ASSOCIATE MEMBERS.

Date of Election.			
1838 Feb.	7.	Karámat Alí, Sayyid.	Hooghly Calcutta
1865 May	3.	Dall, Rev. C. H.	

LIST OF MEMBERS WHO HAVE BEEN ABSENT FROM INDIA  
THREE YEARS AND UPWARDS.\*

*Rule 14, A.*—In the event of an Ordinary Member leaving India, and in the further event of his informing the Secretary by letter that he has no intention of returning, but desires to retain his privileges as an Ordinary Member, his subscription shall be 12 Rupees per annum, commutable into a single payment of Rs. 100, provided that if any such Member shall hereafter return to India, he shall thereupon become liable to pay his original subscription, subject to the operation of rule 10 B.

*Rule 14, B.*—After the lapse of three years from the date of a Member leaving India, if no intimation of his wishes shall, in the interval, have been received by the Society, his name shall be removed from the list of Members.

*Date of leaving India.*

Adley, C. C. Esq.,	1870
Allardyce, A. Esq.,	1870
Asghar Ali Khán Bahádur, Nawab,	1868
Brandis, Dr. D.,	1871
Cole, Lieut. H. H., R. E.,	1869
Cowell, E. B., Esq.,	1864
Egerton, P. Esq.,	1868
Fytche, Major-Genl. A., C. S. I.,	1871
Gray, R. Esq., M. B.,	1870
Gregory, Capt. J.,	1870
Hyde, E. Esq.,	1871
Innes, F. W. Esq., M. D.,	1871
Latham, G. Esq.,	1870
Lees, Lieut.-Col. W. N.,	1868
Macauliff, M. Esq.,	1871
Neil, Dr. A.,	1871
Oldham, R. A. Esq., C. E.,	1870
Rattray, A. Esq.,	1870
Rogers, Capt. B.,	1870
Saunders, J. O'B. Esq.,	1871
Strachey, Major-Genl. R.,	1871
Thompson, Major G. H.,	1864
Thornton, T. R. Esq.,	1870

\* These names will be removed from the next list of members unless intimation is meanwhile received from any of the members of their desire to retain the privileges of ordinary members under the operation of Rule 14 A.



## LOSS OF MEMBERS DURING 1873.

## BY RETIREMENT.

J. H. Newman, Esq., M. D.	Ajmere
J. C. Geddes, Esq., C. S.	Puri
J. W. Curtoys, Esq.	Calcutta
Rev. J. P. Ashton.	Do.
Dr. C. F. Tonnerre.	Do.
Col. G. H. Saxton.	Ootacamund
Mr. E. VanCutsem.	Calcutta
The Hon'ble Sir R. Couch, Kt.	Do.
H. Woodrow, Esq.	Do.
Col. B. Ford.	Madras
Sultan Muhammad Bashiruddin.	Chinsurah
R. T. H. Griffith, Esq.	Benares
Capt. T. H. Lewin.	Chittagong
The Hon'ble R. Spankie.	Allahabad
Dr. J. B. Baxter.	Sandheads
R. B. Smart, Esq.	Centl. Provinces

## BY DEATH.

J. A. P. Colles, Esq., M. D.	Calcutta
V. Irwin, Esq., C. S.	Cuttack
Lieut. J. H. Bourne.	Shillong
W. McLaren Smith, Esq.	Calcutta
N. T. E. Davey, Esq.	Midnapoor
J. L. Stewart, Esq., M. D.	Panjab
Edward Blyth (Hon. Member).	Europe.

## ELECTIONS CANCELLED.

C. P. Bird, Esq., C. S.	Hissar
Col. H. Drummond,	Calcutta





[ APPENDIX. ]

ABSTRACT STATEMENT  
OF  
RECEIPTS AND DISBURSEMENTS  
OF THE  
ASIATIC SOCIETY OF BENGAL  
FOR  
THE YEAR 1873.



RECEIPTS.		1873.		1872.
	Brought over, Rs.	731 12	224,761 2 7	
J. Beames, Esq.	...	37 12 0		
A. M. Markham, Esq.	...	1 4 0		
W. T. Blanford, Esq.	...	49 8 0		
Dr. V. Richards,	...	2 11 0		
Dr. J. F. N. Wise,	...	1 15 0		
Messrs. Trübner and Co.	...	134 8 4		
E. W. Clark, Esq.	...	0 5 0		
The Government of North Western Provinces,	...	13 8 0		
Col. H. Hyde,	...	4 0 0		
Capt. S. B. Miles,	...	0 4 4		
Babu Haris Chandra, Benares, ...	...	5 4 0		
G. Nevill, Esq.	...	5 5 0		
R. A. Barker, Esq.	...	1 2 0		
R. B. Smart, Esq.	...	0 2 0		
M. S. Howell, Esq.	...	0 9 0		
A. V. Nursing Rao, Esq.	...	0 4 0		
Major F. W. Stubbs,	...	4 10 0		
E. T. Atkinson, Esq.	...	4 2 0		
			998 13 10	748 14 3

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Carried over, Rs. 25,760 0 5



## DISBURSEMENTS.

1873.

1872.

Brought over, Rs. 11,403 1 1

## VESTED FUND.

Purchase of 4½ per cent. Government Securities, ...	...	5,700	0	0				
Paid Interest on ditto, ...	...	42	13	3				
Ditto Premium on ditto, ...	...	215	4	0				
Ditto Commission ditto, ...	...	14	14	3				
Ditto Fee for renewing Government Securities, ...	...	2	0	0				
Ditto Commission on collecting Interest on the Government Security, ...	...	0	9	5				
Ditto a receipt Stamp, ...	...	0	1	0				
					5,975	9	11	0 4 4

## BUILDING.

Paid House rate, ...	...	396	0	0				
Ditto Police and Lighting rate, ...	...	210	0	0				
Ditto Water rate, ...	...	199	15	0				
Fitting drainage and Water-pipe to the Society's Premises, ...	...	307	12	0				
Repairing outside of ditto, ...	...	1,839	6	6				
Ditto new works, ...	...	582	0	0				
Supplying new glasses to the windows, ...	...	4	1	3				
					3,539	2	6	853 7 3

## MISCELLANEOUS.

Subscriptions, ...	...	200	0	0				
O. P. Fund, ...	...	600	1	7				
Yusuf Ali Moonshee, ...	...	543	7	0				
Zoological Garden, ...	...	26	0	0				
Bank of Bengal Fund account, ...	...	332	0	0				
Indian Museum, ...	...	11	2	0				
S. E. Peal, Esq. ...	...	1	15	0				
The Rev. J. D. Bute, ...	...	0	9	0				
The Hon'ble J. B. Phear, ...	...	40	0	0				
J. G. Delmerick, Esq. ...	...	2	2	0				
The Government North Western Provinces, ...	...	10	2	0				
J. Beames, Esq. ...	...	21	6	0				
M. S. Howell, Esq. ...	...	0	9	0				
A. M. Markham, Esq. ...	...	15	11	0				
F. S. Growse, Esq. ...	...	5	7	0				
The Rev. A. T. R. Hoernle, ...	...	1	7	0				
Dr. J. F. N. Wise, ...	...	1	3	0				
A. M. Broadley, Esq. ...	...	39	10	0				
Khwajah Ahsanullah, ...	...	1	10	0				
The Rev. C. H. Chard, ...	...	0	6	0				
L. Schwendler, Esq. ...	...	2	6	0				
R. A. Barker, Esq. ...	...	1	2	0				
M. Sashagiri Sastri, ...	...	1	0	0				
E. B. Cowell, Esq. ...	...	10	8	0				
Messrs. Trubner and Co. ...	...	0	1	0				
Dr. F. Stoliczka, ...	...	9	0	0				
J. Wood-Mason, Esq. ...	...	6	8	0				
Capt. Raverty, ...	...	21	3	0				
Major G. E. Fryer, ...	...	1	0	0				
E. T. Atkinson, Esq. ...	...	0	12	0				
Sayed Ahmed Khan Bahadoor, ...	...	0	6	0				
Messrs. Asher and Co. ...	...	2	0	0				

1,910 9 7

Carried over, Rs. 20,917 13 6



	RECEIPTS.	1873.	1871.
	Brought over, Rs. 25,760 0 5		
BALANCE OF 1872.			
In the Bank of Bengal,	...	767 9 4	
Cash in hand,	...	143 15 2	
		<u>911 8 6</u>	

Rs. 26,671 8 11

(Sd.) BUDDINATH BYSACK,  
*Cashier,*  
*Asiatic Society, Bengal.*

(Sd.) F. W. PETERSON,  
(Sd.) ALEXANDER PEDLER,  
*Auditors.*



DISBURSEMENTS.			1873.	1872.
Brought over, Rs. 1,910 9 7			20,917 13 6	
Major F. W. Stubbs,	...	...	4 10 0	
D. C. J. Ibbetson, Esq.	...	...	10 12 0	
C. W. Marshall, Esq.	...	...	3 15 0	
The Hon ble E. C. Bayley,	...	...	0 5 0	
H. C. Williams, Esq.	...	...	0 4 0	
Capt. W. G. Hughes,	...	...	1 0 0	
Capt. J. Butler,	...	...	1 6 0	
John Elliott, Esq.	...	...	0 9 0	
Lecture,	...	...	31 8 6	
Dr. J. M. Foster,	...	...	1 14 0	
			<hr/>	
			1,966 13 1	734 10 3
			<hr/>	
			22,884 10 7	
BALANCE.				
In the Bank of Bengal,	...	...	3,392 14 6	
Cash in hand,	...	...	393 15 10	
			<hr/>	
			3,786 14 4	
			<hr/>	
			Rs. 26,671 8 11	
			<hr/>	
3,786 14 4			(Sd.) BUDDINATH BYSACK,	
To be funded for Admis-			Cashier,	
sion Fees, ... 1,424 0 0			Asiatic Society, Bengal.	
Actual balance available, 2,362 14 4			(Sd.) F. W. PETERSON,	
			(Sd.) ALEXANDER PEDLER,	
			Auditors,	



# STATEMENT

## *Abstract of the Cash Account*

### RECEIPTS.

ORIENTAL PUBLICATION.	1873.	1872.
Received by Sale of Bibliotheca Indica,... Rs.	2,776 2 7	
Ditto by Subscription to ditto, ...	128 2 0	
Ditto Refund of Postage and Packing charges,	41 14 8	
Refund of Commission from Babu P. C. Ghosha, on Sale to the Registrar General Office, ...	21 0 6	
	2,970 3 9	2,570 4 8

### GOVERNMENT ALLOWANCE.

Received from the General Treasury at 500 Rs. per month, ...	6,000 0 0	
Ditto ditto additional grant for the publication of Sanskrit works, at 250 per month,...	3,000 0 0	
	9,000 0 0	9,000 0 0
Asiatic Society of Bengal, ...	600 1 7	
Babu Bhaeya Lal, ...	80 0 0	
Thakur Greprasad Sing, ...	14 6 6	
Babu Yogodranarain Rai, ...	26 3 9	
Juggomohun Surma, ...	25 5 6	
K. Jyavier, Esq. ...	0 12 0	
M. Sashagiri Sastri, ...	45 12 0	
Babu Prophullo Chunder Banerjee, ...	1 14 0	
Honuman Row, Esq. ...	0 2 0	
Gopal Row Hury Desha Mookh,...	0 4 0	
Ramkrisha G. Bhadar Kur, ...	1 2 0	
Sanker P. Pandit, ...	6 14 0	
Pandita Chandra Kanta Tarkalanker, ...	22 12 0	
Babu Harendra Coomar Chaudhury, ...	3 6 0	
J. Woodburn, Esq. ...	5 4 6	
Balwant Rao Govind, ...	4 14 0	
China Tumby, G. W. ...	8 0 0	
Babu Braj Bhushan Das, ...	131 13 0	
F. S. Growse, Esq. ...	1 8 0	
	975 6 10	416 12 6

### CONSERVATION OF SANSKRIT MSS.

Received from the Accountant General of Bengal, in part of the amount sanctioned towards the conservation of Sanskrit MSS. being 2nd half of 1872-73, ...	1,550 0 0	
Refund of the amount paid Babu Rájendra Lála Mitra, as advance for purchase of Sanskrit MSS. ...	400 0 0	
Ditto ditto of the ditto paid travelling allowance, ...	25 0 0	
Sale proceeds of 27 copies Notices of Sanskrit MSS. ...	27 0 0	
	2,002 0 0	3,543 0 0

Carried over, Rs. 14,947 10 7



## No. 2.

*Oriental Publication Fund, 1873.*

DISBURSEMENTS.				1873.	1872.
ORIENTAL PUBLICATION.					
Paid Commission on Sale of Books, &c.,	...	476	5 5		
Ditto Packing charges,	...	35	4 0		
Ditto Postage Stamps,	...	105	6 10		
Ditto Freight,	...	87	11 0		
Ditto Advertising charges,	...	400	0 0		
Ditto Insufficient Postage,	...	0	10 0		
Refunded the Commission to Babu P. C. Ghosh, on Sales to the Registrar General's Office,	...	21	0 6		
Petty charges,	...	6	5 0		
				1,132	10 9 959 4 0
LIBRARY.					
Paid Purchase of Sanskrit MSS.	...	372	2 0		
Ditto ditto of Persian MSS.	...	240	0 0		
Ditto ditto of Lithographed or Printed Editions of Sanskrit MSS.	...	165	0 0		
Ditto Petty charges,	...	0	4 0		
				777	6 0 323 14 0
CUSTODY OF ORIENTAL WORKS.					
Paid Salary of the Librarian,	...	360	0 0		
Ditto Establishment,	...	661	8 0		
Ditto Stationery,	...	32	2 0		
Ditto Fee for Stamping Cheques,	...	3	2 0		
Ditto Book-binding,	...	34	4 0		
Ditto Bearing Postage,	...	0	5 0		
Ditto Repairing Glass-Case,	...	6	3 6		
Ditto Binding Ledger,	...	2	0 0		
Ditto Carbolic Acid,	...	20	0 0		
Ditto Printing charges,	...	56	0 0		
Ditto Books cleaning,	...	17	5 3		
Ditto Petty charges,	...	27	12 0		
				1,220	9 9 1,038 4 0
CATALOGUE OF SANSKRIT MSS.					
Paid Salary for Cataloguing Sanskrit MSS., at 30 Rs. per month,	...	360	0 0		
				360	0 0 360 0 0
AKBAERNÁMAH.					
Paid Printing charges,	...	496	0 0		
				496	0 0 96 0 0
TAITTIRIYA ARANYAKA OF THE BLACK YAJUR VEDA.					
Paid Printing charges,	...	277	4 0		
				277	4 0 151 8 0
Carried over, Rs.				4,263	14 6



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RECEIPTS.	1873.	1872.
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Brought over, Rs. 14,947 10 7		
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Carried over, Rs. 14,947 10 7	
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DISBURSEMENTS.		1873.	1872.
Brought over, Rs.		4,263 14 6	
FARHANG-I-RASHÍDÍ.			
Paid Editing and Printing charges,	... 1,182 8 0	1,182 8 0	1,153 0 0
ÁÍN-I-AKBARÍ.			
Paid Editing and Printing charges,	... 619 0 0		
Ditto Preparing an English Index of Persons and things and Geographical Index to First Volume of English Translation of the Áín i Akbari,	... 80 0 0	699 0 0	1,021 9 0
CHATURVARGA CHINTAMANI.			
Paid Editing and Printing charges,	... 1,312 12 0	1,312 12 0	1,312 12 0
TABAQÁT I NÁSIRÍ.			
Paid Messrs. Gilbert, Revington, Printers, London, for Printing charges, ..	821 7 9		
Ditto Landing charges, &c., for bringing a box of ditto from the Jetty, ...	6 6 0	827 13 9	533 0 0
SAMA VEDA.			
Paid Editing and Printing charges,	... 1,205 6 6	1,205 6 6	656 6 0
MAÁSIR I 'ÁLANGÍRÍ.			
Paid Maulavi 'Abdul Hai, for correcting 6½ forms of ditto, ...	25 0 0	25 0 0	445 0 0
SHAUTA SUTRA.			
Paid Editing and Printing charges,	... 435 0 0	435 0 0	
GOBILYA GRHYA SUTRA.			
Paid Editing and Printing, ...	562 12 0	562 12 0	474 0 0
TAITTIRIYA SANHITTA.			
Paid Editing and Printing charges, &c. ...	342 0 0	342 0 0	956 0 0
PRITHIRAJ RASU.			
Paid Printing charges, ...	236 0 0	236 0 0	
PÁDISHAHNÁMAH.			
Paid Editing and Printing charges,	... 652 14 0	652 14 0	
ATHARVANA UPANISHAD.			
Paid Editing and Printing charges,	... 988 15 0	988 15 0	332 9 0
CHAND'S POEMS.			
Paid Freight and Postage for sending 2 Packages of ditto to the Rev. A. F. R. Hoernle, Benares, ...	2 6 0	2 6 0	34 10 6
SANHITA DARPANA.			
Paid Bearing Postage on a Copy of ditto, ...	0 6 0	0 6 0	
COPYING MSS.			
Paid Copying MSS., ...	20 4 0	20 4 0	57 9 0
Carried over, Rs. 12,756 15 9			



## RECEIPTS.

1873.

1872.

Brought over, Rs. 14,947 10 7

## BALANCE OF 1872.

In the Bank of Bengal, viz.

Conservation of Sanskrit MSS. \* 3,976 8 5

Dr. J. Muir, ... 898 10 0

O. P. Fund, ... 1,262 8 9

Cash in hand, ... 6,137 11 2

10 8 8

6,148 3 10

Rs. 21,095 14 5

(Sd.) BUDDINATH BYSACK,  
Cashier.  
Asiatic Society, Bengal.F. W. PETERSON,  
ALEXANDER\* PEDLER,  
Auditors.



DISBURSEMENTS.

1873.

1872.

		Brought over, Rs. 12,756 15 9 .
Babu Braj Bhushan Das, ...	...	9 8 6
Kavi Purapa Venout Ratnam Pantua, ...	...	6 12 0
Babu Bhaiya Lal, ...	...	2 15 0
V. Subbiah, Esq. ...	...	0 3 2
Thakura Giriprasad Singh, ...	...	19 10 0
Jogendranarain Roy, ...	...	3 7 0
Gopal Rao Hury Deshmukh, ...	...	0 4 0
K. Jyavier, Esq. ...	...	0 3 2
Pandita Chandrakanta Tarkalanker, ...	...	1 11 0
Asiatic Society of Bengal, ...	...	71 8 2
M. Sashagiri Sastri, ...	...	44 14 0
F. S. Growse, Esq. ...	...	1 8 0
Balwant Rao Govind, ...	...	7 15 0
		<hr/> 170 7 0

CONSERVATION OF SANSKRIT MSS.

Paid Selary for preparing Catalogue of Sanskrit MSS. ...	...	360 0 0
Ditto ditto for translating the Sanskrit Catalogue, ...	...	240 0 0
Ditto printing charges of Notices of Sanskrit MSS. ...	...	333 8 0
Ditto Postage for sending of ditto ditto, ...	...	16 5 6
Ditto Freight for ditto ditto, ...	...	14 4 0
Ditto Copying MSS. ...	...	55 7 0
Ditto for Stationery, ...	...	74 14 0
Ditto Purchase of Sanskrit MSS. ...	...	290 8 0
Ditto Travelling Pandit as advance for travelling allowance, ...	...	25 0 0
Ditto Packing charges, ...	...	6 12 0
Ditto Salary for travelling Pandit, ...	...	300 0 0
Ditto Printing Paper, ...	...	28 12 0
Ditto reproduced by Photo-Zincography first of the Chaturvarga Hotra on tinted ground 500 pulls only printing, ...	...	79 0 0
Ditto Babu Rajendralala Mitra, as an advance for Purchase of Sanskrit MSS. ..	...	400 0 0
Ditto a Blank Book in 6 quires for Register of MSS. ...	...	6 8 0
Ditto Travelling allowance, ...	...	10 0 0
Ditto Petty charges, ...	...	3 18 0
		<hr/> 2,244 11 6

BALANCE.

In the Bank of Bengal, viz.

Conservation of Sanskrit MSS. 3,733 12 11		
Dr. J. Muir, ...	...	898 10 0
O. P. Fund, ...	...	1,267 15 5
		<hr/> 5,900 6 4
Cash in hand, ...	...	23 5 10
		<hr/> 5,923 12 2
		<hr/> Rs. 21,095 14 5

(Sd.) BUDDINATH BYSACK,  
Cashier.  
Asiatic Society, Bengal.

F. W. PETERSON,  
ALEXANDER PEDLER,  
Auditors.



STATEMENT No. 3.  
*Shewing the Assets and Liabilities of the Asiatic Society of Bengal on the 1st Jany. 1874.*

ASSETS.		1873.	1872.	LIABILITIES.		1873.	1872.
CASH.				Salary and Establishment, ...		Ra. 262 6 8	
In the Bank of Bengal,	...	Ra. 3,392 14 6	767 9 4	Baptist Mission Press, Printing charges.			
Cash in hand,	...	393 15 10	143 15 2	Journal Part I, No. 3 and			
Government Securities,	...	7,700 0 0	2,000 0 0	Part II, No. 3 of 1873,	888 10 0		
				Plate Paper for ditto, ..	34 13 3		
		11,486 14 4	2,911 8 6	Ditto Printing charges—			
				Proceedings, No. VII and			
				No. VIII of 1873, ...	198 4 0	1,121 11 3	
OUTSTANDING.				Add—			
Admission fees,	...	384 0 0	320 0 0	Proceedings, Nos. IX and X,	290 0 0		
Subscription,	...	6,733 7 0	5,685 9 0	Journal Parts I and II of			
Sale of Journal,	...	413 13 6	357 9 0	No. 4, ...	900 0 0	1,190 0 0	
Subscription of ditto,	...	688 12 9	796 2 9				
Sale of Library Books,	...	520 1 0	390 7 0				
		8,740 2 3	7,549 11 9				
O. P. Fund,	...	641 1 5	112 8 0				
Bank of Bengal Fund account,	...	332 0 0	0 0 0				
		Ra. 9,713 3 8	7,662 3 9				
						Ra. 2,574 1 11	

F. W. PETERSON,  
ALEXANDER PEDLER.



STATEMENT No. 4.  
*Shewing the Assets and Liabilities of the Asiatic Society of Bengal O. P. F. on the  
1st January, 1874.*

ASSETS.		1873.	1872.	LIABILITIES.		1873.	1872.
In the Bank of Bengal, viz.				Salary and Establishment for 1873, ...Rs.		90 5 4	
Conservation of Sanskrit MSS.		Rs. 3,733 12 11		Baptist Mission Press, printing charges			
Dr. J. Muir, ...		... 898 10 0		Ain i Akbari, &c. &c. ...		1,015 10 0	
O. P. Fund, ...		... 1,267 15 5		Ganesa Press—Printing charges.			
			5,900 6 4	Mimansa Darsana, Fasc. IX, 100 6 0			
Cash in hand, ...		...	23 5 10	Chaturvarga Chintamani,			
Government allowance for Dec., 1872, ...		...	750 0 0	Fasc. XI, ...		302 4 0	
Bibliotheca Sale and Subscription, ...		...	1,820 14 0	Agni Purana, Fasc. IV. ...		250 12 0	
Col. Dalton Ethnology of Bengal, ...		...	42 13 8	Sama Veda, Fasc. X. ...		260 1 0	
						913 7 0	
				Abdur Rahim, making Index of Munta-			
				Khab ul lubab, ...		220 0 0	
				Babu Rajendralala Mitra, editing charges			
				Agnipurana, ...		127 8 0	
				The Valmiki Press, printing charges			
				Latayana Sutra, Fasc. IX, balance, ...		173 13 0	
				Kabiruddin Ahmad, editing			
				and printing charges Isabab, 81 0 0			
				Khafr Khan, ...		539 0 0	
				Copying 978 pages of Khafr			
				Khan, ...		63 10 0	
						632 10 0	
				Sutto Varata Sama Srani, editing charges			
				Sama Veda, Fasc. X, ...		104 0 0	
				Shreajast Ali, purchase of Persian MSS., ...		492 0 0	
						3,819 5 4	
				Conservation of Sanskrit MSS.,		...	3,733 12 11
				Dr. J. Muir, ...		...	898 10 0
				Asiatic Society of Bengal, ...		...	641 1 5
						Rs. 9,092 13 8	

Rs. 8,537 7 10 8,767 0 10

F. W. PETERSON,  
ALEXANDER PEDLER.



# STATEMENT No. B.

## Conservation of Sanskrit MSS. in Account Current with the Asiatic Society of Bengal.

Cr.		Dr.	
	1873.		
Balance of 1872,	Ra. 3,976 8 5	Amount spent in 1873,	Ra. 2,244 11 6
Received from the Government of Bengal,		Balance, "	" 3,783 12 11
being the half sum sanctioned annually			5,978 8 5
Ra. 3,100, towards Conservation and			
Publication of Sanskrit MSS. for the			
second half of 1872-73,	1,550 0 0		
Refund of the amount paid Babu B. L.			
Mitra, as advance for purchase of Sans-			
krit MSS. on the 13th September, 1873,	400 0 0		
Ditto ditto paid travelling Pandit, as ad-			
vance for travelling allowance on the			
2nd April, 1873,	25 0 0		
Sale proceeds of 27 copies of Notices of			
Sanskrit MSS.	27 0 0		
	5,978 8 5		
	Ra. 5,978 8 5		Ra. 5,978 8 5

F. W. PETERSON,  
ALEXANDER PEDLER.



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL.

EDITED BY  
THE HONORARY SECRETARIES.

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JANUARY TO DECEMBER,  
1875.

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CALCUTTA :  
PRINTED BY C. B. LEWIS, BAPTIST MISSION PRESS,  
1876.







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PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR JANUARY, 1875.

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The monthly General Meeting of the Society was held on Wednesday, the 6th instant, at 9 o'clock P. M.

Col. H. Hyde, R. E., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table:—

1. From the Secretary, Government of India, Home Department, a photograph of a colossal granite image in the Tinevelly District.

2. From M. E. Aymonier, a copy of 'Dictionnaire Francaise-Cambodgien.'

3. From M. Stanislas Meunier, a copy of the work entitled "Cours de Géologie Comparée."

4. From the Government of Bombay, a copy of the Memorandum on the Buddhist Caves at Junnar, by J. Burgess, Esq., and Translations of three Inscriptions from Badami, Pattadkal and Aiholli, by J. F. Fleet, Esq., Bombay C. S.

5. From F. Beaufort, Esq., a specimen of Sponge grown in a tank in the Dollanda Asylum.

Mr. Wood-Mason remarked that the mass exhibited was a dried specimen of the common freshwater Sponge that abounded in the tanks of Calcutta and its vicinity.

The following gentlemen, duly proposed and seconded at the last meeting, were elected ordinary members—

John Sutherland Gunn, Esq., M. B., Surgeon, Bengal Army.

Capt. C. S. F. S. Forbes, Deputy Commissioner, Shwegyeen.

Richard Lydekker, Esq., Geological Survey of India.

The following are candidates for ballot at the next meeting—

James Armstrong, Esq., Surgeon Bengal Army, proposed by Mr. H. B. Medlicott, seconded by Mr. J. Wood-Mason.



R. S. Whiteway, Esq., Asst. Magistrate, Moradabad, proposed by Mr. F. S. Growse, seconded by Mr. H. Blochmann.

J. Smidt, Esq., German Consul, proposed by Mr. H. Blochmann, seconded by Mr. L. Schwendler.

W. J. Porter, Esq., Assistant Supdt. of Police, Semroo, Arakan, proposed by Capt. W. G. Hughes, seconded by Capt. J. Waterhouse.

The following gentlemen have intimated their desire to withdraw from the Society—

E. D. Lockwood, Esq., Monghyr.

R. T. St. John, Esq., Bassein.

Sir W. J. Herschel, Cooch-Behar.

Lieut. W. S. Bisset, R. E.

The election of the undermentioned gentlemen who have not paid their admission fees is cancelled—

Amir Hossain Khan Bahadur.

C. F. Bligh, Esq.

G. C. Farr, Esq.

J. W. Johnstone, Esq., M. D.

Babu Mohima Chundra Chuckervatty.

E. O'Brien, Esq.

B. O'Brien, Esq.

Babu Sutyadyal Banerjee.

„ Vepena Veharry Mukerjee.

The President announced the receipt of a communication from the Secretary to the Government of India, Foreign Department, requesting suggestions from the Council of the Society on any matters of general or scientific interest to which the attention of the officers employed on the Yunan Mission might be directed, and stated that the Council have had the following suggestions drawn up for submission to the Government.

#### SUGGESTIONS FOR THE YUNAN EXPEDITION.

##### *Archæology.*

It is believed that inscriptions may possibly be found throughout the country traversed. It is possible that near Momein there may be some in the Arabic character, but it is almost certain that many in the Chinese character will be met with everywhere within the Chinese territory, as it is a common Chinese custom to erect arches, pillars, &c., many of which are inscribed with either edicts or personal notices. Those that are modern will hardly be worth copying; but where the buildings are reputed to be



ancient, or where the characters in which they are inscribed are not the ordinary characters of the country, and especially where more than one set of characters appears to be employed (bilingual and even trilingual inscriptions are not unknown in various parts of China), impressions, hand copies, or photographs might be taken. Small inscribed objects of a similar nature of apparent antiquity might be purchased.

Of ancient buildings, or buildings of architectural value, photographs, plans, and sketches might be made, and such information as can be procured regarding them noted down. Ancient Chinese MSS. might be bought, if procurable, but much judgment would be required in their selection; as to this, Mr. Elias would probably be able to advise. They should be transmitted to Hongkong or England, as they would be of no use in India. It is just possible, however, that old MSS. of the Qorán or other Arabic works may be procurable from amongst the spoils of the Panthays. If so, these might be secured. Chinese numismatics have, it is believed, become a study of some interest in Europe, but no hints can be given as to the value of the coins to be sought for.

It is just possible also that in some of the more famous Buddhist places, old Sanskrit MSS. may exist. Of these it is probable the mission could not procure the originals, but copies might be obtained. It is not believed, however, that the mission will meet with such good fortune. Chinese works being avowedly translations from the Sanskrit, or bearing on the connexion of China and India, would be valuable, especially those of a Buddhistic character.

#### **Ethnology.**

The various races or tribes, of whom any trustworthy observations can be made or obtained, should be carefully distinguished: their typical characteristics, whether physical or in the mode and general circumstances of life and social economy, dwellings, implements, dress, funeral ceremonies and customs, and so on, should be noted. Their own traditions concerning their origin, tribal names, migrations, should be sought; and all sound information that can be collected in regard to language and history will be most valuable. Facts which serve to differentiate between Aryan and non-Aryan peoples should be especially looked for; and any Hindu-Aryan ingredient, when it can be detected, and the extent to which it prevails, should be marked. Also all data which could afford a reasonable foundation for comparison or connexion between the Mongolian and Malayan people of Burmah and China, on the one side, and the Kols and the Dravidian races of the peninsula of India, on the other, should as far as possible be secured. If any traces of pre-historic people can be discovered, such as may exist in the shape of human or animal remains, stone or metal implements, weapons, &c., in caves and gravel de-



posits, all the available evidence bearing on this head should be got together. And it need hardly be added that, in all cases where it is possible, measurements should be made, and photographs taken of typical specimens of differing peoples and races, with the view to exhibiting and precisely recording their general appearance and costume, their distinctive facial characteristics and shape of head, both for males and females.

#### **Meteorology.**

On the march, of course, little can be done in the way of instrumental observations. Wind and cloud observations, however, may be made at all times without the aid of instruments other than a compass. It is scarcely necessary to say that among the mountains, the winds are greatly affected by the direction of the valleys, so that the movement of the clouds is the best, and in many cases the only, criterion of that of the great air currents. Advantage then should be taken of any opportunity of observing the direction in which clouds, immediately over-head, drift. The estimated proportion of clear sky (0 to 10), the forms of the clouds, and the general character of weather should also be recorded. On open plateaux, a register of the direction and the estimated force of the wind according to Beaufort's scale is specially important.


When a halt is made at any place and thus an opportunity of making instrumental observations afforded, the chief points to which attention should be given are the following :—

1. The diurnal range of temperature in the shade from the maximum and minimum thermometers. Care will be required in selecting a proper place for the thermometers to guard them from being affected by direct radiation to or from the clear sky.

2. The minimum temperature of radiation at night should be observed whenever possible by a thermometer placed on forked sticks a few inches above the ground. In taking these observations, it is necessary, if the ground is not level, to place the instrument in a slight *hollow*, or on black woollen cloth in a shallow box, or it will be affected by the convection of the air, and show a temperature many degrees higher than one protected from this influence.

3. A few sets of hourly barometrical observations extending from midnight to midnight (or, when this is not possible, from sunrise to sunset) would be very valuable. It will be interesting to see whether the diurnal oscillation follows the same law as on the Indian plains, or that of the Himálayan hill-stations.

4. When hourly observations of the barometer are made, those of the *hygrometer* should be made also. Besides these, observations of the wet and dry bulb thermometers should be taken at other times as often as practicable.





5. Wind and cloud observations have already been referred to. Any opportunity which may occur of observing the local variations of the mountain and valley winds should be taken advantage of. The diurnal changes of the wind in the valleys and passes are of special interest. Any observations of the night winds which blow down the valleys, the time they set in, their duration, force, and temperature will be important. Also their upper and lower limits.

It might also be worth while, if possible, to make local enquiries regarding the seasons, the prevailing winds, and the rainfall.

Barometric readings will probably be taken on the march for the determination of heights. As connected with the subject of meteorology it may not be out of place to remark here that whether atmospheric pressures be inferred directly, for this purpose, from the readings of a barometer, or indirectly from the boiling temperature of water, the observations should be made with a view to determine relative heights, or differences of heights, and not absolute altitudes above sea level. The absolute height of a given place above sea-level can only be determined from means of barometric observations, with any approach to accuracy, when the mean pressure of the air in the particular latitude, and for the particular time of year at sea-level, is known and also the direction and magnitude of the atmospheric *gradient*. But differences of heights may be calculated from day to day, in serene weather, by comparing observations of the pressure of the atmosphere (whether determined by barometer, or boiling point, the former of course being the more accurate) made at the same hours on successive days. It is obvious that only observations made at the same hours can be compared, as the difference of pressure between the 10 o'clock maximum and the 4 o'clock minimum, supposing it to be the same as in the plains of India, might correspond to a difference in altitude of about 130 feet. However, observations made on the same day at no greater intervals than one hour, and the shorter the interval the better, might be usefully compared to show approximately the difference in level between the bottom and the top of a mountain pass. The probable error for a difference of time of one hour would not be greater than 20 feet in excess or defect according to the circumstances. Such observations could be very conveniently made with a good, large aneroid, which should be frequently compared with the mercurial barometer, as aneroids are very liable to get out of order.

#### Geography.

The main objects of Geographical research are doubtless well understood by the members of this Expedition, who have had so much practical experience in traversing unknown countries, and especially Mr. Ney Elias, the account of whose travels through China and Mongolia to the Russian capital, in the Journal of the Royal Geographical Society, is so well known.



It is believed that both this gentleman and Dr. Anderson have made full preparations as to suitable instrumental equipment, and every arrangement, for obtaining the best information as to the physical character of the country to be traversed, and for laying down the route, and sketching as much of the subtending country as possible, with the view to improving our Geographical knowledge of Western China.

It is not practicable to lay down detailed instructions on every occasion of an exploring expedition starting, as to outfit, equipment, and the use of instruments, neither is it necessary to go into the elements of surveying, adjustment of instruments, and practical astronomy, as best adapted for such purposes. But the members of this expedition may advantageously be referred to, and supplied with, that valuable little pamphlet prepared and published by a Committee of the Council of the Royal Geographical Society in 1871 (price 1 shilling) entitled "Hints to Travellers," which contains all that any explorer can possibly require to study and work up, for the determination of "Time," "Azimuth," "Latitude" and "Longitude;" also on portable instruments, together with types of all the Computations, Formulæ, &c. with Tables for Barometrical Heights, observations on the proper selection of instruments, adjustments, meteorological instructions, hints on the projection of routes, tables for rough triangulation without the use of instruments or computations, measurements of the velocity of rivers, and various other useful, easy and expeditious methods of ascertaining all that may be necessary to know.

This little work, addressed to "persons intending to explore a wild country, and who who want to know what astronomical and mapping instruments, and what observations for latitude and longitude ought to be made," will be found of the most eminent service, and it takes up but very small space to carry about. If other works can be taken as part of the outfit, on such expeditions, these may be mentioned.

Galton's "Art of Travel."

Jackson's "What to Observe."

"Admiralty Manual of Scientific Enquiry," revised edition.

"Manual of Survey for India," 3rd Edition, 1875.

Books in fact in the present day are so numerous and cheap, so practical and abridged for portability, that the list might be extended indefinitely. Enough however appears to have been quoted, for the real necessities of Indian Geographical explorations.

#### Geology. •

There is no information in hand regarding the geology of the region between that already described by Dr. Anderson in western Yunnan, and the east centre of China. Some further information regarding the age and



extent of the volcanic region of Momein, or of its having any connection with older eruptive rocks would be of much interest.

In a brief notice of the Geology of China in the "*Zeitschrift der Deutschen Geologischen Gesellschaft*" for Sept. 1873, Herr von Richthofen dwells principally upon the Löss formation, but mentions that gneiss is found everywhere to underlie Silurian, Devonian, Carboniferous, and Triassic strata, thus implying the presence of these formations; he adds that he had found no younger rocks, hence concluding that since the Trias that ground had not been submerged. These observations would seem to be confined to the north of China and to the basin of the Hoang-ho, for in a previously published paper, in the *American Journal*, he mentions finding nummulitic limestone in force, and full of characteristic fossils, 60 miles to the west of Shanghai, resting nearly horizontally upon ancient sandstones of great thickness, having a dip of  $20^{\circ}$ , and in which plant-remains had been found.

Von Richthofen's remarks upon Löss formation suggest further examination. In general characters the deposits he describes resemble the great valley deposits of India that we are disposed to call by the same name; and he himself compares it to that of the Rhine valley; yet certain features he mentions of the Löss of the Hoang-ho are peculiar to it as compared with those analogous, at least, with that in India. He describes it as containing well preserved landshells and the bones of fossil animals so abundantly as to be used for manure. This feature may perhaps be connected with, and peculiar to, the mode of formation he suggests for the Löss of that region—from wind-borne materials. He mentions the custom of the people to excavate extensive permanent dwelling places in the steep banks of the deep Löss, which are sometimes from 400 to 500 feet high. The depth of the Löss he estimates at 1500 feet.

In another paper Von Richthofen notices the region of King-te-chin, of porcelain celebrity, east of the Poyang lake, south of the Yang-tse-kiang. The eastern slopes and ridges of the mountains are formed of an extensive sandstone formation resting against and upon porphyries, and on the main ridge capping a great clay-slate formation, which he calls the King-te-chin series. These latter are highly compressed, with a steady W. S. W.—E. N. E. strike. It is in regular bands in these slates that the famous kaolin-rock occurs, the name being that of once famous quarries. It is a hard fine slate, of a green colour, somewhat resembling jade, and when pounded forms a white powder, which is sold in bricks to the porcelain makers. The Chinese still apply this name (Kao-ling, 'high ridge') to the finest quality; an inferior kind being called Pe-tun-tse (white clay). Near Poyang lake, the King-te-chin slates are overlaid by the coal formation, of palæozoic age, from which coal is largely extracted for the steamers on the Yang-tse. He identifies the coal approximately with that found in the northern provinces.



In 1870, Professor Owen described some large mammalian fossils from China. One was alleged to be from marly beds in the neighbourhood of Shanghai; and others, of much fresher aspect, said to be from a cave near the city of Chunts-king-foo in the province of Sze-chuen. As compared with the condition of the Siwálik fossils, these cave bones present an appearance of comparative unchangedness. Yet Professor Owen unhesitatingly ranked them with that fauna, as older pliocene or miocene. Dr. Anderson's mention of an elephantine fossil tooth "not recent," from the "superficial deposits" of the Taping valley, would seem to confirm the circumstances reported of Professor Owen's fossils. It would be most interesting to throw further light upon this question. The fauna of the old river deposits of the valleys of India were broadly distinguished by Falconer from that of the Siwálíks.

#### **Zoology.**

A member of the party being a Zoologist, it will be unnecessary to offer any suggestions on this head.

#### **Botany.**

The country lying between the Indian Empire and China is almost unknown from a botanical point of view. Many Japanese species have a range as far as to the Khásia hills, and some of them are found also in the Himálayas. It is of high interest to trace their distribution and to find out whether they are out-runners from a central Chinese Hill-Flora, or whether they are of a truly Japanese origin. In order to come to any reliable conclusions in this regard, every plant, species, herb or wood, should be collected. The characteristic of the Chinese Flora consists chiefly in the great preponderance of woody plants (especially trees), and these should specially be looked for. The hill-ranges bordering Burmah are of a more tropical nature (especially in the valleys), and here the collecting of plants will be rather difficult. Further to the east, after crossing the Salween and Mekong rivers (or probably much earlier), a quite temperate vegetation begins, and many of the plateau-lands of Yunan proper bear even a poor vegetation, as is shewn by the explorations of the French Mission to Indo-China under Lieut Lagrée. Here the collecting of plants will be as easy as in Europe, and this the more so as the trees are of much lower growth.

It is thought that 20 bundles (each of about 1½ feet deep) of drying paper will be quite sufficient for the drying and preservation of the plants during the whole tour, but it is suggested that the drying paper should be solely used for drying and not for packing up the dried specimens, for which latter purpose other paper should be used. Collecting duplicates is always a great incumbrance when travelling, and if it is done by a non-expert, it is very usual that the most common things are those that are gathered in larger quantities. It is therefore suggested that of every species only a



few good and complete specimens (not mere fragments) be taken. These should be carefully ticketed and the label should state locality and date, and it should record, if the plant is cultivated or taken from a garden. It depends upon the skill and experience of the collector to make notes on the frequency, range, and elevation of each species. Notes on the colour of the flowers and fruit, uses, etc., are always of great value.

If any opportunity should arise for sending dried collections back to Bhamo, they should be sent by that route as long as the Mission travels on this side of the Salween.

As to what should be taken it may be said, every plant, whether herb, shrub or tree. It would also be desirable that cryptogams should be gathered. The latter can be dried in the same way as phanerogams, but in the case of many Fungi and Algæ a good many manipulations and even microscopical drawings (in the case of *Spirogyras*, etc.) are indispensable for their future identification.

The dried plants should be put between dry paper and packed in wax cloth (also while travelling), in order to prevent their being spoiled should the rains set in.

A specimen of every plant met with should be preserved, and in order to get an idea of the geographical distribution of species along the entire line of route, a memorandum should be made of the plants seen every day. As the plants will probably be collected by one who does not know the names even of their natural orders, probably the best memorandum in most cases will be to collect a fragment of every species met daily. In other words, a few perfect specimens of each species met with should be collected for (subsequent) determination or description; but besides these, smaller specimens (sufficient for comparison with the perfect ones) should be collected daily, to show geographical distribution. Of course, if accurate notes can be made, the necessity of collecting such fragments is avoided.

A perfect specimen consists, in the case of small species, of an entire plant bearing leaves, flower-buds, expanded flowers, and ripe fruit: in the case of large species, of a small mature branch (young shoots should not be taken) bearing characteristic leaves, and of branches bearing buds, flowers, and ripe fruit. Where a plant bears leaves of two forms, specimens of both should be taken.

Each individual specimen should have attached to it a ticket bearing note of locality, or elevation above sea, and date of collection, also notes of colour of flower, of native name (if it can be got on apparently reliable authority) and of reputed properties and uses, also a note of the parts used. The ticket of *each individual specimen should invariably be attached to it when first put into the drying paper.* Writing tickets at any subse-



quent time usually leads to blundering, and if not attached to specimens, tickets are apt to get mixed in changing the drying paper.

*Succulent fruits* should be preserved in spirit and should have parchment tickets attached with particulars noted, and reference to dried specimens of their leaves. The colour of the ripe fresh fruit should be noted.

When thoroughly dry, plant specimens should be put between sheets of thin dry paper and made up into convenient bundles for transit to the Botanical Garden, Calcutta, by the earliest available opportunity. Wild and cultivated plants should be distinguished.

*Seeds.* Ripe seeds of every plant met with should be collected. They should be exposed to air and gentle heat (the sun's rays are best) until quite dry, and when quite dry should be made in small parcels in dry paper, numbered, and ticketed. Seed parcels should be sent to the Calcutta Botanical Garden by post, in bags (which will be supplied), by every available opportunity.

*Bulbs* (as of lilies), tubers (as of ground orchids) and fleshy underground stems of all sorts should be collected and packed in baskets in dry grass, moss, or lichen.

Baskets are better than boxes as they permit of ventilation. But the contents of these baskets must be *kept dry* during wet weather even at the expense of temporarily preventing ventilation.

Pieces of stems or entire leaves of succulent plants, such as house-leek (*Sedum*), &c., may be preserved alive for months, if treated in the way suggested for bulbs.

Epiphytal orchids should be collected and carried *dry* in baskets.

*Fern Spores*, should be shaken out (if ripe) on an old newspaper, and then collected and made up in small packets. They should be sent to the Botanical Garden, Calcutta, by post.

*Ripe Cones of Firs*, should be kept tied up with string until the seeds naturally fall out. When this occurs, the cones, except a few for specimens, may be thrown away and the seeds alone kept.

*Dye Stuffs and Vegetable Medicines*, also *Substances used in the Arts*. Specimens with all available reliable particulars should be collected in bazars or elsewhere; and, wherever possible, perfect botanical specimens of the plants producing them with the native name of the *plant* itself.

*Paper.* Specimens of, and of the material from which made.

*Food Stuffs.* Specimens of and of plants producing them.

*Rhubarb.* (Medicinal): seeds and specimens of plants producing.

*Camphor.* Specimens of the various sorts with full particulars of mode of extraction and specimens of the plants whence derived.

"*China Root.*" Said to grow in the provinces of Honan, Kwangtung, and Kwangsi. Specimens of product and of plant.



*Root called "Green Putchuk."* Said to be product of an *Aristolochia*. Specimens of and of the plant producing.

*Cassia Bark.* Specimens of the tree producing, with good samples of the bark (old and young), and from the same tree.

*Cassia Buds.* Do. Do.

*Bamboos.* Seeds of in quantity. There are some specially desirable, small sorts, and some large with yellow and striped stems.

*Cardamoms.* Specimens of the sorts undernoted and of the plants producing them. *N. B.* Living Rhizomes of the plants should be collected for introduction of the species to Indian cultivation.

*Yang-chun-sha.* Hairy China Cardamom : said to be grown in Province of Kwang-tung.

*Tsaou Kow.* Large round Cardamom.

*Yih-che-tsze.* Bitter seeded Cardamom.

*Tsaou-kwo* or *Quá-len.* Ovoid China Cardamom.

*Cryptogamic plants.* Mosses and Lichens should be gathered in fructification if possible. Each species should be either dried like a flowering plant or wrapped up in a separate paper-parcel.

*Algae* should be well washed and dried like flowering plants, but with little pressure.

*Tea and Tea Culture.* Observations might be made on the mode of culture and manufacture, and seed should be collected of any particular variety of merit.

*Fibres.* Specimens of and of plants producing.

*Oranges.* Seeds of all varieties met with, and any good information as to culture.

*Horticulture.* The Chinese being very skilful gardeners, observations and notes might be made on any striking or novel modes of culture.

*Opium.* Information as to the cultivation of in China, with specimens of the drug itself and of the plant yielding it.

#### Sanitation.

With reference to the questions of a sanitary character which it would be possible for the Native Assistant-Surgeon accompanying the Yunan Mission to investigate, whilst carrying on the ordinary duties of a Medical Attendant, it is suggested that as much definite information as possible regarding the following diseases should be collected as may be met with, and should be carefully recorded at the time that it is obtained.

1. *Cholera.* If epidemic or endemical it has existed: What time of the year prevalence, soil, water, &c.? the treatment of the inhabitants?



2. *Small-pox*. If present, to what extent prevalent and at what season : If inoculation is resorted to ?

3. *Fevers*. Malarial ; typhus ; typhoid ; scarlatina. Treatment adopted for Ague.

4. *Goitre*. If observed in mountainous districts to what extent prevalent ; and, if at low elevation, whether the water of the district was hard or soft ?

5. *Dysentery*. If of a very fatal character ; and the treatment adopted in the various districts ?

6. *Urinary Calculi*. To what extent prevalent and the remedial means adopted.

7. *Syphilis*. If of a very virulent kind ; to what extent prevalent ; and, is mercury employed in its treatment ?

8. *Elephantiasis*.

9. *Leprosy*.

10. *Guinea Worm*.

Any further information that could be obtained concerning the diseases and food-supplies of the people.

It would also be very desirable that samples of any special remedial agents which are met with should be preserved, when their nature could not be ascertained at the time.

### Photography.

The most satisfactory dry process Capt. Waterhouse has worked is the following. It is simple, and the materials for the preservative are obtainable anywhere.

#### I. *Preparation of the Plates.*

The plates must be carefully cleaned and coated on *one side* only with the following mixture :—

Albumen,..... 1 ounce.

Water,..... 40 ounces.

or one Indian egg to a wine-bottle of water, well shaken, and carefully filtered. After being coated with this, the plates are set aside to dry in a place quite free from dust.

#### II. *Sensitising the Plates.*

The plates are coated on the albumenised side, in the ordinary way, with a good bromo-iodised Collodion (a mixture of Thomas' and Mawson's bromo-iodised Collodions, with the addition of 2 grains of bromide of cadmium to the ounce, gives good results) and immersed in a 45-grain silver bath for about 5 minutes. After which the plate is soaked in four successive



baths of distilled water for 5 minutes each. (If distilled water is not easily available, common water, if tolerably pure, may be substituted for the distilled water in the last three baths), and then immersed in a dish containing the following preservative carefully filtered, or if this is inconvenient, the mixture may be poured on and off the plates once or twice, taking care to avoid bubbles.

Decoction of Coffee,..... 2 pints (1 ounce of coffee.)

Sugar, ..... 8 drams.

White of one egg.

The plates are allowed to remain a few minutes in this and then removed and set up to drain on clean blotting paper and allowed to dry in a box or other place free from dust. Plates so prepared are said to keep for some months in Europe, but I have no experience how long they would keep in an Indian climate.

### III. *Exposure.*

For the exposure no certain rule can be given, but I find the plates require about twice or three times the exposure of wet plates, and about 1 minute would probably be the exposure for small plates, such as would be carried on an expedition, travelling as lightly as possible. This, however, must be tested beforehand.

### IV. *Development.*

The plates are first of all flushed with a mixture of equal parts of spirits of wine and water, and then well washed with clean water.

Supposing the plate to be  $\frac{1}{4}$  size, or  $4\frac{1}{4}'' \times 3\frac{1}{4}''$ , take 2 drams of a solution of—

I.—Pyrogallie acid, ..... 12 grains.

Water,... ..... 1 ounce.

and pour it over the plate and back into the developing cup, then add two or three drops of a mixture of

II.—Strongest Liquor Ammonia,..... 1 part.

Water, .....  $\frac{1}{4}$  parts.

and one drop of

III.—Bromide of Potassium, ..... 4 grains.

Water, ..... 1 ounce.

and again apply to the plate. If a proper exposure has been given, the details will at once become visible and gradually gain strength, till all possible detail is out. Should, however, the plate have been *under exposed*, and the details be slow in appearing, a drop or two more of No. II. must be added, but if the plate has been much over-exposed and the details flash out, it may be advisable to at once add a drop or two of No. III.



When all detail has been brought out by this preliminary development, the plate is again washed and flowed over with 2 drams of the pyrogallie solution, No. I., to which have been added six drops of a solution of

IV.—Citric acid, .....	60 grains.
Glacial acetic acid, .....	30 minims.
Water, .....	1 ounce.

This is poured back again into the developing cup and two or three drops of

V.—Nitrate of Silver, .....	20 grains.
Water (distilled), .....	1 ounce.

having been added, it is again applied to the plate and the details, previously very thin and scarcely visible by *transmitted* light, gradually acquire a sufficient density for printing purposes.

Should the intensification be slow by reason of under-exposure, a drop or two more of No. V. may be added from time to time, a drop of No. IV. accompanying each such addition. The plates may then be fixed, after washing, with a weak solution of cyanide of potassium or hyposulphite of soda. Should they appear too weak after fixing, the intensifying operation last described may be repeated, but over-intensification should be guarded against as the pictures are sometimes more dense actually than they appear to the eye.

Great care should be taken to keep prepared sensitive dry plates perfectly dry and free from moisture, and also to preserve them from any influence of light.

The Year Books of Photography and Abney's Instructions in Photography will give full instructions regarding dry and wet-plate photography.

The President also announced the receipt of a communication from Mon. Lucien Adam, Nancy, inviting the Society's co-operation in promoting the objects of the *Congrès Internationale des Americanistes*, and laid the papers connected with the subject on the table.

Mr. Blochmann laid his readings and translations of the following inscriptions before the meeting :—

#### Jaunpu'r.

General Cunningham, C. S. I., has favoured the Society with a rubbing of the inscription on a pillar in front of the Masjid in Jaunpúr Fort. The inscription consists of six lines, of which the second is almost entirely illegible. The historical portions, however, are clear.

The inscription commemorates the erection of a mosque in 778, or 1377, A. D. by Ibráhím Náib Bárbak, whom Zíá uddín Baraní states to have been Fírúz Sháh's brother.



بسم الله الرحمن الرحيم إنما يعمر مساجد الله من آمن بالله و اليوم الآخر  
 وقال رسول الله صلى الله عليه وسلم من بنى مسجدا لله تعالى اعطاه الله بكل  
 شبر ..... سلطان سلاطين عالم شهر يار عادل اعظم مالك  
 رقاب الامم مولى ملوك العرب والعجم مظهر كلمة الله العليا المتمسك بالعروة  
 الوثقى الناظر لادين الله الحافظ لبلاد الله الحامى لعباد الله ذو الامن والامان  
 لاهل الايمان وارث ملك سليمان . . . ابوالمظفر فيروز شاه السلطان خلد الله  
 ملكه وسلطانه وبزمان ملك ملوك الشرق والصين سلطان السلاطين ناصر الغزوة  
 الموحد بين عمدة الاصنام عدة الايام صبهكش زمان . . . الخ اعظم ابراهيم نايب  
 باربك سلطان يديم الله معاليه بشرف كار فرمائى ابن عالي مقام مشرف گشت  
 ابن ملك نيكوسيرت صافي اعتقاد باتمام اين بناء خير جهد تمام فرمود بهاء ذو القعدة  
 معظم وبسال هجري نبوي صلى الله عليه وسلم ثمان وسبعين وسبعماية ١١

In the name of God, the merciful, the clement. Surely, he will build the mosques of God who believes in God and the last day [Qorán]. And the Prophet (blessings upon him) says, 'He who builds a mosque for God, will receive from God every gift....[In the reign of] the king of the kings of the world, the just and great ruler, the lord of the necks of nations, the master of the kings of Arabia and Persia, who professes the exalted creed and seizes the firm handle, who watches over God's faith, protects God's lands, and defends God's servants, who gives the Faithful peace and security, the heir of the kingdom of Solomon,.... A b u l M u z a f f a r F í r ú z Sh á h, the king—may God perpetuate his kingdom and his rule! and in the time of the Malik of the Maliks of the East and of China, the king of kings, the helper of the warring monotheists, the excellent Imám, the hope of the age, the general of the present time,.... the great U l u g h I b r á h í m N á i b B á r b a k, the king,—may God continue to him his high position!—(this building) received the distinction of being erected, and this Prince, whose walk of life is good and whose faith is pure, exerted himself to the utmost to finish this religious edifice. In the exalted month of Zil Qa'dah and in the year 778 of the Flight of the Prophet, upon whom rest God's blessings [April, 1376].

Shams i 'Afif has a long chapter on Ibráhím Náib Bárbak, in which he says that he was so attached to his brother Fírúz Sháh and the latter to him, that both slept in the same room, waited for each other when commencing to chew betel, and that he died before Fírúz Sháh. Then follow similar puerilities in schoolboy style, adorned with two quotations from Sa'dí. The chapter has been deservedly left out by Prof. Dowson (Elliot's *Historians*, III, p. 372.)

Tilbegampú'r, Parganah Sikandarábád, S. E. of Dillí.

Mr. E. T. Atkinson, C. S. sent the Society a reading of the following inscription found on the facing of an old well in Mauza' Tilbegampúr.



بسم الله الرحمن الرحيم  
 این جلا و چهنال در عهد ظل الله فی العالمین محمد همایون بادشاه غازی  
 خلد خلافتہ بدولت وعون همت شجاع الدین امیر فقیر علی بیگ بهادر بنیاد  
 ساخت مهتاد تو این باسدها کہتری بتاریخ غرة يوم الجمعة فی شهر جمادی الثاني  
 منه خمس اربعین تسع مائة ॥

### श्रीगणेशाय नमः ।

अविरलमदजज्ञनिवहं भसरकुलानेकसेवितकपोलं ।

अभिमतफलदातारं कामेशं गणपतिं वन्दे ॥ १ ॥

अथ शुभसंवत्सरेऽस्मिन् श्रीवृष विक्रमादित्यराज्ये संवत् १५९५ श्रावे १४९० वर्षे  
 मार्गशिरमासे शुक्ले पक्षे दशमीतिथौ शनिवासरे उत्तरानक्षत्रे वरिधाननामयेऽग्रे शुभमुहूर्ते  
 वज्रमानराज्ये योगिनीपुरे पतिसाहस्रमात्रं आशा प्रवर्तमाने तस्य आशाकारी श्रीमौर  
 फकीरखसीवेग वर्तमाने ॥ अचियाव्ये । गडियलपुरे गेजे श्रीश्याम तत्पुत्रादिना तस्य पुत्र  
 राजाधिराज परमवैश्व । षट् दर्शन आसीत् तत्पुत्र महतादित्य बापीकारिका ।  
 बाहीकारार्द्र । आचन्द्रार्कात् पुत्रपौत्रैः सह शुभं भूयात् ॥

#### *Persian Translation.*

This well and this aqueduct was made during the reign of the shadow of God in the world Muhammad Humáyún Pádisháhi Ghází, may his sovereignty be perpetuated! and with the auspicious help and approval of Shujá' uddín Amir Faqír 'Alí Beg Bahádur by Mahatádittú, son of Básdahá, the K'hatri, on Friday, 1st Jumáda II, 945 [26th October, 1538].

#### *Hindi-Sanskrit Translation.*

Obeisance to Sri Ganesa! I bow to him whose cheeks are frequented by numerous black bees, attracted by the everflowing *mada* juice, who is the dispenser of desirable fruits, who is the lord of desires and the chief of the ganas.

In this auspicious year, in the year of the era of the reign of Prince Vikramáditya, 1595, Sak era 1460, in the month of Agrahayána, in the bright phase of the moon, on her tenth day, Saturday, in the constellation Uttara, in the Yoga varyán, in an auspicious moment, in the under-mentioned dominion, Jagini Pura, when the rule of Emperor Humáyún was enforced, during the lifetime of his order-bearer Amír Fakír 'Alí Beg, in the village Gariyal in the family of Syama Mahatáditta well versed in six darsanas, a great Vaishnava prince made this well, and opened it to the public, with the view of securing the prosperity of his sons and grandsons so long as the sun and the moon endure.











## MANIPURI ALPHABET

(incomplete)

 k     kh     g     gh

$2m_n$   $\mathcal{A}_{ch}$   $\mathcal{F}_{chh}$   $\mathcal{M}_0$

 th
  d
  dh
  n

$\mathcal{J}_{\text{ai}} \quad \overline{\omega}_{\text{th}} \quad \mathcal{M}_{\text{d}} \quad \overline{\gamma}_{\text{dh}}$

$\tau_n$     $\gamma_b$     $\mathcal{J}_{bh}$     $FFz_m$

८ १ ८ २

SPECIMEN of MANIPURI MANUSCRIPT.

શ્રી ૧૦૮ નાગોરોદ્દાનંદી

33 124 || 125 || 126 || 127 || 128 || 129 ||

੫੨॥ ਥਾਏ ਮਠਾਏ ਥੇ॥

ॐ नमो भगवते वासुदेवाय ॥



The following letter from Mr. G. H. Damant, C. S. was read—

CACHAR, December 6th, 1874.

MY DEAR MR. BLOCHMANN,

I have found here some MSS. in a character I cannot read. I am told there are a few old Manipuris who can read it, but I have not succeeded in finding one yet. One of the MSS. is said to contain a history of Tipperah and might be interesting historically, but I am at present puzzling over the alphabet. If you could give me any assistance I should be extremely obliged. I give some of the letters which Mr. McWilliam obtained from a Manipuri, but I cannot answer for their correctness.

The alphabet is not complete, but these specimens may be enough to identify it. I give also a bit of the MS. as near as I can copy it. (Plate I.)

The following papers were read :—

1. *The Etymology of Local names in Northern India, as exemplified in the District of Mathurá.*—By F. S. GROWSE, M. A., B. C. S.

The paper will be published in No. IV. of the Journal, Pt. I, for 1874.

2. *On an apparently unnamed species of Phœnicopterus.*—By W. EDWIN BROOKS, C. E.

(Received Nov. 26th, 1874).

A considerable number of Flamingos have been shot during the last few years by my friend Mr. Anderson, of Futtehghurh, who, after a careful examination of the series, has come to the conclusion that two large but closely allied species of Flamingo are to be found in India. Not only were old birds in fine rosy plumage procured, but also immature of both; and the specific distinctness of each was manifest. Mr. Anderson wishes me to describe the new, or rather the long overlooked flamingo, and I therefore do so as

PHENICOPTERUS ANDERSONI, n. sp.

General coloration similar to that of *P. antiquorum* (*P. roseus*) but of a much paler rosy colour, the whole head, neck, breast, and lower parts, as well as back and tail, being considerably less tinged with rose-colour than in *P. antiquorum*; red portions of wing not so bright; axillaries, which are wholly carmine in *P. antiquorum*, are very pale rosy, tipped with brown; primaries and secondaries, which are black in *P. antiquorum*, are dark brown and sometimes only moderately brown, the depth of the colour depending upon the season and upon the age of the feather; *coverts to primaries white, edged with pale brown on the inner web, and broadly tipped with the same colour; coverts to secondaries, or the greater coverts, as they are usually called, white, broadly tipped with a rather darker brown; both these wing-coverts in P. antiquorum, are wholly rose colour: the difference in wing-coverts forms the principal distinction by which Mr. Anderson's species can*



be easily known : the white feathers of the head and neck when turned back are found to have the basal and larger portion of a grey colour ; but in *P. antiquorum*, the adults have these feathers white to their very bases : this forms another very good distinction between the two species : the bill is very similar in both but, being somewhat the larger of the two, *P. Andersoni* has a proportionately larger one ; the chin feathers, however, advance towards the lower mandible in a much more obtuse angle ; the legs and feet are duller and paler.

Length of a male, 50 in. wing 16·9 ; tarsus 14·75 ; bare portion of tibia 10 in. ; of a female, length 43 in. ; wing 15 in. ; tarsus 11·75 in. ; bare portion of tibia 8 in.

Dimensions of *P. antiquorum* (male), wing 16·5 ; tarsus 12·75 ; bare portion of tibia 10·25 ; female, length 40 ; wing 14 ; tarsus 10·25 ; bare portion of tibia 7·5 in.

Two or three years ago, I sent examples of each of these birds to England, and the conclusion arrived at by some of the best authorities there was, that they were one and the same bird ; the more rosy one being a more advanced stage of the paler. But from the number of each which I have examined, I have full confidence that *P. Andersoni* will never put on the full rosy plumage of *P. antiquorum*. That the species will be attacked, and weighty names brought to bear against it, I do not doubt ; but a satisfactory test of the correctness of my conclusion as to the validity of the two species is only to be attained, I submit, by careful observation of an individual of each during its passage through all its stages in confinement. Apart from the prominent distinctions already pointed out, the colour of the primary quills cannot be so much affected by age in any one species as to present so great a difference as that which exists between the two under consideration. There is another point which I should mention. Blyth appears to have given the name of *P. antiquus* to an Indian flamingo ; but whether this was to the well known species or to another, I have no means of finding out. Evidence may eventually be forthcoming to clear this point up, when *P. Andersoni* may become a synonym of *P. antiquus* ; but in the meantime, I have thought it most convenient to define the unnamed bird so long confounded with *P. antiquorum*.

The immature of each is very distinct, but detailed descriptions would make this paper tedious.

4. *Description of four new species belonging to the family Stenopidae from the N. E. Frontier of Bengal, with drawing of Helicarion gigas, Benson and a variety of the same.*—By MAJOR H. H. GODWIN-AUSTEN, F. R. G. S., F. Z. S.

The paper will be published in the Journal Part II, 1875.



## LIBRARY.

The following additions have been made to the Library since the meeting held in December last.

*Presentations.*

••• Names of Donors in Capitals.

Proceedings of the Zoological Society of London, for the year 1874, Parts II and III.

Part II.—*The Secretary*—Announcement of the arrival in the Society's Menagerie of a Javan Rhinoceros (with plate). *The Rev. S. J. Whitmee*—Letter relating to a *Didunculus* and two Curlews sent to the Society's Collection, and to the habits of *Pareudiastes pacificus*. *T. H. Huxley*—On the Structure of the Skull and of the Heart of *Menobranchus lateralis*. *Capt. W. H. Unwin*—On the Breeding of the Golden Eagle (*Aquila chrysaetos*) in North-western India. *Lieut. R. W. Ramsay*—Description of a new Species of Wood-pecker from British Burmah. *W. T. Blanford* and *H. E. Dresser*—Monograph of the Genus *Saxicola*, BECHSTEIN, with plates. *W. T. Blanford*—Exhibition of, and remarks upon Horns of the Wild Goat of Persia (*Capra egagrus*), and of Horns of the same animal from Sind.

Part III. *A. H. Garrod*—On some points in the Anatomy of the Columbeæ. *Frederic Moore*—List of Diurnal *Lepidoptera* collected in Cashmere Territory by Capt. R. B. Reed, 12th Regt., with descriptions of new Species. *A. G. Butler*—List of the Diurnal *Lepidoptera* of the South-Sea Islands. *Prof. Newton*—Exhibition of two letters, the property of J. B. Wilmot, Esq., M. D., referring to a live Dodo. *W. C. McIntosh*—Notice of a memoir on the *Annelida* collected during the 'Porcupine' Expeditions of 1869 and 1870. *G. E. Dobson*—Notes on the Respiration of some Species of Indian Freshwater Fishes. *Dr. Ed. Grube*—Descriptiones Annulorum novorum mare Ceylonicum habitantium ab honoratissimo Holdsworth collectorum. *The Rev. O. P. Cambridge*—On some new Species of *Drassides*. *Dr. James Murie*—On the Nature of the Sacs vomited by the Hornbills. *Dr. F. Stoliczka*—Description of the *Ovis poli* of Blyth. *Alfred Newton*—On a Living Dodo shipped for England in the year 1628. *R. Swinhoe*—On a small Tufted Hornless Deer from the Mountains near Ningpo. *J. E. Harting*—On the Eggs of some little-known *Limicole*.

Transactions of the Zoological Society of London, Vol. VIII, Part 9.

*J. Murie*—Researches upon the Anatomy of the *Pinnipedia*:—Descriptive Anatomy of the Sea-Lion (*Otaria jubata*).

## THE ZOOLOGICAL SOCIETY OF LONDON.

Journal of the Statistical Society. Vol. 37. Part III. September, 1874.

*Sir Charles W. Dilke*—Local Government among Different Nations.

## THE STATISTICAL SOCIETY OF LONDON.

Proceedings of the Royal Geographical Society of London, Vol. XVIII. No. V. Address by the Right Hon'ble Sir H. Bartle Frere.

## THE ROYAL GEOGRAPHICAL SOCIETY OF LONDON.



The Geographical Magazine. No. IX., for December, 1874.

The Arctic Expedition.—Irrigation in Southern India. The Tamraparni System.

THE EDITOR.

Bulletin de la Société de Géographie, September and October, 1874.

September. *Wilson* :—Préparatifs de l'expédition scientifique Russe de l'Amour-Daria. *H. Duveyrier*—Livingstone. *E. de Bellomayre*—Notice sur le stadimètre géographique, (with illustration).

October. *Ch. Weyprecht et J. Payer* :—Expédition austro-hongroise au pôle nord de 1872 à 1874 (avec deux cartes dans le texte).

THE GEOGRAPHICAL SOCIETY OF PARIS.

Proceedings of the Academy of Natural Sciences of Philadelphia. Parts I and II. January to September, 1873.

Part I. *W. H. Dall*—Catalogue of the Recent Species of the Class *Brachiopoda*.

Part II. *E. D. Cope*—On an Anorous Batrachian from the Eocene of Wyoming. *Andrew Garrett*—Descriptions of a new species of *Goniadoris*. *Andrew Garrett*—Descriptions of new species of Marine and Land Shells inhabiting the South Sea Islands. *Theodore Gill*—On the Affinities of the Sirenians. *Thos. G. Gentry*—Influence of Nutrition on Sex among the Lepidoptera. *John L. Leconte*—Synonymical Remarks upon North American Coleoptera.

Journal of the Academy of Natural Sciences of Philadelphia. New Series. Vol. VIII. Part I.

*Isaac Lea*—Description of fifty-two Species of *Unionidæ*. *Edw. D. Cope*—On the Homologies and Origin of the Types of Molar Teeth of *Mammalia Educabilia*.

THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

Mémoires de la Société D'Ethnographie. Vol. 12<sup>e</sup> partie 1873.

*Léon de Rosny*—Extraits du Ti-Tou Tsoung-yao relatifs aux peuples étrangers à la Chine.

THE ETHNOGRAPHICAL SOCIETY OF PARIS.

Aarboger for Nordisk Oldkyndighed Og Historie, udgivne af det kongelige Nordiske Oldskrift-Selskab. Hefte III and IV. 1873.

THE ROYAL UNIVERSITY OF NORWAY.

Atti della Reale Accademia Delle Scienze di Torino. Vol. IX. Disp. 2 and 3, 1814.

Disp. 2. *Lessona e Tapparone-Canefri* :—Nota Sulla *Macrocheira Kaempferi* SIEB. e sopra una nuova specie del genere *Dichelapsis* Cossa—Comunicazione intorno alla germinazione dei semi nel protossido d'azoto.

Disp. 3. *Luvini*—Di un nuovo strumento meteorologico-geodetico-astronomico il *Dieteroscopico*. *Salvadori*—Intorno al Genere *Cymborhynchus* VIGORS.—Nuovo specio del Genere *Cracticus* VIEILLLOT.

THE ROYAL ACADEMY OF SCIENCES OF TURIN.

Bulletin de la Société Impériale des Naturalistes de Moscow, 1873. No. IV.

*Prof. Th. Bredichin*—Observations spectroscopiques du Soleil faites pendant l'été et l'automne de 1873. *Prof. A. Stoletow*—Notiz über die Magnetisirungsfunktionen



verschiedener Eisenkörper. *Victor Motoshoulsky*—Énumération des nouvelles espèces de coléoptères rapportés de ses voyages.

THE IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW.

Dictionnaire Français-Cambodgien. By E. Aymonier.

THE AUTHOR.

Stray Feathers. Edited by Allan Hume. Vol. II. No. 6.

A First List of the Birds of the Tenasserim Provinces. *R. B. Sharpe*—Note on *Carcineutes amabilis*, HUME. *Megalaima incognita*, HUME. *Lophophorus Sclateri*, JERD. *R. B. Sharpe*—Note on *Pelargopsis intermedia*, HUME. Additional Notes on the Avifauna of the Andaman Islands. *R. B. Sharpe*:—Catalogue of the *Accipitres*.

THE EDITOR.

Memoirs of the Geological Survey of India. Vol. XI. Part I.

*F. R. Mallet*—On the Geology of the Darjiling District and the Western Duars.

Records of the Geological Survey of India. Vol. VII. Part 4, 1874.

*R. B. Foote*—The Auriferous Rocks of the Dambal Hills, Dharwar District. *W. Theobald*:—Remarks on certain considerations adduced by Falconer in support of the Antiquity of the Human Race in India. *V. Ball*—Geological notes made on a visit to the Coal recently discovered in the country of the Luni Pathans, south-east corner of Afghanistan. *William King*—Note of the progress of Geological investigation in the Godavari District, Madras Presidency. *Theodore W. H. Hughes*—Notes upon the subsidiary materials for Artificial Fuel.

THE SUPERINTENDENT OF THE GEOLOGICAL SURVEY OF INDIA.

The Calcutta Journal of Medicine. (Edited by Mahendra Lāla Sarcar, M. D.) Nos. 8 and 9, Aug. Sept. 1874.

*The Editor*—The Garjan Oil treatment of Leprosy.

THE EDITOR.

The Christian Spectator. Vol. IV. No. 42. December, 1874.

THE EDITOR.

Annual Report of the three Lunatic Asylums in the Madras Presidency during the year 1873-74.

Annual Report of the Madras Medical College, Session 1873-74.

THE GOVERNMENT OF MADRAS.

A Classified Alphabetical Catalogue of Sanskrit MSS. in the Central Provinces, by Dr. F. Kielhorn.

THE CHIEF COMMISSIONER OF THE CENTRAL PROVINCES.

Conchologia Indica; Part V.

English-Russian Grammar, or Principles of the Russian Language, for the use of the English. By Charles Philip Reiff.

Ornithologie Européenne, ou Catalogue Descriptif, Analytique, et Raisonné des Oiseaux observés en Europe. By C. D. Degland and Z. Gerbe. Vols. I and II.

Sixth Annual Report of the United States Geological Survey of the Territories embracing portions of Montana, Idaho, Wyoming, and Utah;



being a report of progress of the Explorations for the year 1872. By F. V. Hayden.

Lahore to Yarkand. By Geo. Henderson, M. D. and Allan O Hume, Esq., C. B.

The Birds of India. By T. C. Jerdon, Surgeon Major, Madras Army. In three volumes.

Grammar of the Persian Language. By Duncan Forbes, LL. D.

▲ Compendium of Domestic Medicine. By John Savory.

Dr. Hooper's Physician's Vade Mecum. By W. Augustus Grey, M. B.

Johnson's Dictionary of the English Language. (Pocket Edition.)

First, Second, and Third Annual Reports of the United States Geological Survey of the Territories for the year 1867, 1868, and 1869, under the Department of the Interior.

Boletin del Museo Publico de Buenos Aires, Nos. I and VI.

Illustrated Catalogue of the Museum of Comparative Zoology at Harvard College. No. VII. Revision of the Echini. By A. Agassiz, Parts I and II, with 49 plates.

Stray Feathers. Vol. I. Nos. 1-6 and Vol. II.

Sitzungs-Berichte der Naturwissenschaftlichen Gesellschaft Isis in Dresden. For 1871, 1872 and first quarter of 1873.

On the Systematic Position of the *Brachiopoda*. By Edw. S. Morse.

Seventh Account of New Species of Snakes in the Collection of the British Museum. By A. Günther, M. A., M. D.

On some Persian, Himalayan, and other reptiles. By J. Anderson, M. D.

Note on a hitherto unpublished Drawing in the Buchanan-Hamilton Collection, representing *Barbus Beavani*. By Dr. Albert Günther.

Notes on 'Stray Feathers.' By W. T. Blanford.

Descriptions of new Land and Freshwater Shells from the Khási, North-Cachar, and Nágá Hills, N. E. Bengal. By Major Godwin-Austen.

Note on the Gazelles of India and Persia, with Descriptions of a new Species. By W. T. Blanford.

Descriptions of some Ceylonese Reptiles and Batrachians. By Dr., Albert Günther.

On the Nature and Probable Origin of the Superficial Deposits in the Valleys and Deserts of Central Persia. By W. T. Blanford.

Notes on the Synonymy of some Indian and Persian Birds, with descriptions of two New Species from Persia. By W. T. Blanford, (2 copies).

Notes on some Rodents from Yarkand. By John Anderson, M. D., Curator of the Indian Museum, Calcutta.

Examination of certain "Remarks on Indian Fishes" made by Mr. Francis Day in the "Proceedings of the Zoological Society." By Albert Günther.



On two Species of *Hydrosaurus* from the Philippine Islands. By Albert Günther.

On the Reptiles and Amphibians of Borneo. By Dr. Albert Günther. Conchological Memoranda. No. XII.

The Pectens, or Scallop-Shells. By R. E. C. Stearns.

Descriptions of Seventeen New Species of Land and Marine Shells. By Henry Adams.

Hand-List of the Specimens of Shield Reptiles in the British Museum.

By Dr. J. F. Gray.

On the Land-Shells of Penang Island, with descriptions of the Animals and Anatomical Notes. Part Second, *Helicacea*. By Dr. F. Stoliczka. 37 copies.

Notes on Burmese and Arakanese Land Shells, with descriptions of a few Species. By W. Theobald and Dr. F. Stoliczka.

Notes on some Indian and Burmese Ophidians, by Dr. F. Stoliczka.

On *Aquila Bifasciata* and *Aquila Orientalis*, by W. E. Brooks, C. E.

Notes on the Ornithology of Cashmir, by W. E. Brooks, C. E.

Contribution to our Knowledge of *Ceratophrys* and *Megalophrys*. By Albert Günther.

Ueber das Wachsthum von *Lymnaeus Stagnalis*. By Prof. C. Semper.

Proceedings of the Asiatic Society of Bengal, Nos. 5 and 7, 1872. 7 to 10, 1873. No. 1, 1874.

Journal of the Asiatic Society of Bengal, Part I. Nos. 1 to 4, 1873 and No. 1, 1874. Part II. No. 1, 1868, No. 3, 1872, Nos. 2 to 4, 1873, (No. 3 duplicate), and No. 1, 1874.

#### STOLICZKA BEQUEST.

##### *Purchase.*

The American Journal of Science and Arts. Vol. VIII. No. 45, September, 1874.

Alfred M. Mayer—Researches in Acoustics.

The Annals and Magazine of Natural History Vol. 14. No. 82, October, 1874.

Dr. J. E. Gray—On the General *Paradoxurus*, *Platyschista* and *Paguma*, and Notes on some Species lately received in the British Museum. H. J. Carter—Descriptions and Figures of Deep-sea Sponges and their Spicules from the Atlantic, dredged up on board H. M. S. 'Porcupine,' chiefly in 1869: with Figures and Descriptions of some remarkable Spicules from the Agulhas Shoal and Colon, Panama. John Scott—On a Collection of *Hemiptera Heteroptera* from Japan. Descriptions of various new Genera and Species. Messrs. Parker, Jones and Brady—On Priority in the Discovery of the Canal-system in *Foraminifera*. J. Leidy—Remarks on the Revivification of *Rotifer vulgaris*.

Quarterly Journal of Microscopical Science, October, 1874. No. 56.

F. M. Balfour—A Preliminary Account of the Development of the Elasmobranch



Fishes, (with plates). *E. Ray Lankester*—Observations on the Development of the Pond-snail (*Lymnaeus stagnalis*) and on the Early Stages of other Mollusca. *E. A. Schäfer*—Description of an Apparatus for Maintaining a Constant Temperature under the Microscope.

The London, Edinburgh, and Dublin Philosophical Magazine, and Journal of Science. October, 1874. Vol. 48, No. 318.

*Alfred M. Mayer*—Researches in Acoustics. *James O'Kinealy*—On a New Formula in Definite Integrals. *Fred. Guthrie*—On an Absolute Galvanometer. *L. Schwendler*—On Earth Currents.

The Numismatic Chronicle and Journal of the Numismatic Society, 1874, Part II. No. 54.

Journal of the Society of Arts. Vol. XXII. Nos. 1138 to 1142, Sept. and Oct. 1874.

No. 1139. The Tea Industry of Bengal. The Bamboo.

No. 1140. The Japanese Mint.

No. 1142. Trans-Himalayan Routes.

The Westminster Review. No. 92. October, 1874.

Indian Public Works:—The Non-responsibility of the Indian Government Officials.

Mind and Body. The Theories of their Relation. By Alexander Bain, LL. D.

The Forms of Water in Clouds and Rivers, Ice and Glaciers. By John Tyndall, LL. D., F. R. S.

Responsibility in Mental Disease. By Henry Maudsley, M. D.

The New Chemistry. By Josiah P. Cooke.

Index of Spectra. By W. Marshall Watts, D. Sc.

Animal Locomotion, or Walking, Swimming, and Flying, with a dissertation on Aëronautics. By J. Bell Pettigrew, M. D.

The Conservation of Energy, being an elementary treatise on Energy and its Laws. By Balfour Stewart, M. A., LL. D.

The Study of Sociology. By Herbert Spencer.

Foods. By Edw. Smith, M. D.

The Science of Law. By Sheldon Amos, M. A.

Physics and Politics, or Thoughts on the application of the Principles of 'Natural Selection' and 'Inheritance' to Political Society. By Walter Bagehot.

The Mechanical Principles of Engineering and Architecture. By Henry Mosely, M. A., F. R. S.

Essays on the Languages, Literature, and Religion of Nepal and Tibet: together with further papers on the Geography, Ethnology, and Commerce of those Countries. By H. B. Hodgson, Esq.

Revue des Cours Scientifiques de la France et de l'Etranger. From 1863 to 1870, 7 Vols.



La Revue Scientifique de la France et de l'Etranger, Revue des Cours Scientifiques (2nd series). From July 1871 to June, 1874, 6 Vols.

Dictionary of Chemistry, 5 vols., with Supplement. By Henry Watts.

Revue des Deux Mondes, 15th Sept. and 1st Oct. 1874.

Journal des Savants. August and September, 1874.

Comptes Rendus Nos. 9 to 13, 1874.

No. 9. *M. P. Monillefert*—adresse quelques observations sur l'emploi des principaux insecticides essayés au laboratoire de Cognac et sur les vignes des environs.

No. 10. *M. Gruy*—Observation d'un passage extraordinaire de corpuscules sur le Soleil.

No. 11. *M. Allégret*—Sur une transformation des équations de la Mécanique céleste.

No. 12. *M. Fordos*—De l'action des liquides alimentaires ou médicamenteux, sur les vases en étain contenant du plomb. *M. A. Lallemand*—Sur la diffusion lumineuse.

Megasthenes' Indica. By Dr. E. A. Schwanbeck.

Culturgeschichte in ihrer Natürlichen Entwicklung bis zur Gegenwart. By Friedrich von Hellwald. Parts 6 and 7.

Reise in Ostindien, in Briefen an Alexander von Humboldt und Carl Ritter. By Leopold von Orlich.

Die Reise seiner Königlichen Hoheit des Prinzen Waldemar von Preussen nach Indien in den Jahren 1844 bis 1846.

Die Erdkunde von Asien. By Carl Ritter, 28 Vols.

Pratna Kamra Nandini or the Hindu Commentator. A Monthly Sanskrit Journal. Vol. VII, No. 6.

#### *Exchange.*

The Athenæum for September, 1874.

Nature, Nos. 263 to 265.

The Indian Antiquary, November, 1874.

*Prof. J. Eggeling*—An Inscription from Badámí. *Editor*—Dolmens at Konur and Aiholi. *A. C. Burnell*—Pahlavi inscriptions in South India. *Editor*—The Temples of Amarnáth. *G. H. Damant*—Legends from Dinájpur. *Rev. J. Wilson*—The Beni Israel of Bombay. *E. Rehatsek*—An Inkstand with Arabic inscription. Progress of Oriental research in 1872-73. *Dr. J. Muir*—M. Auguste Barth on the State of Indian Society in the time of Buddha. *W. R. Cornish*—Report on the Census of the Madras Presidency 1871. *Max Müller*—Paradise. *Rev. F. Kittel*—Nijaguna.







PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR FEBRUARY, 1875.

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The Annual Meeting of the Society was held on Wednesday, the 3rd February, 1875, at 9 o'clock P. M.

Colonel H. Hyde, R. E., President, in the chair.

According to the bye-laws of the Society, the President ordered the voting papers to be distributed for the election of Officers and Members of Council for 1875, and appointed Messrs. Waldie and Schwendler, Scrutineers.

The President then called upon the Secretary to read the Annual Report.

ANNUAL REPORT FOR 1875.

In submitting their Annual Report on the state of the Society's affairs during 1874, the Council have to congratulate the Society on the fact that its condition, though apparently less flourishing than in 1873, is still satisfactory, both as regards the state of its funds and the number of its paying or effective members.

The number of elections during the year under review has been 35, against 44 of the previous year.

During the year the Society has lost 14 ordinary members by withdrawal, 11 by cancelling and 5 by death, in all 30, leaving a net increase of 5 ordinary members.

At the commencement of 1874, there were 358 ordinary members on the list, but in accordance with the provisions of rule 14, the names of 22 who had been absent from India upwards of three years, and were not likely to return, have been struck off, so that there will now be a total of 336 + 5, or 341 ordinary members on the list.

Of these 341 members, 48 are absent from India, of whom 13 are subscribing members, 3 are life members, thus making a total of 309 paying members, of whom 140 are resident and 169 are non-resident. The name of one of the latter has to be removed to the absentee list under rule 14B.



The table below shows the fluctuations of members during the last ten years, and it will be observed that the number of effective members in the year under report is larger than in any of the preceding years.

Year.	Paying.			Absent.	Total.
		Resident.	Non-Resident.	Non-paying.	
1865	267	136	131	109	376
1866	293	124	169	94	387
1867	307	154	153	109	416
1868	294	159	135	133	427
1869	304	162	142	138	442
1870	266	134	132	148	414
1871	286	112	174	160	446
1872	279	105	172+2 L.M.	159	438
1873	305	116	186+3 L.M.	53	358
1874	312	140	169+3 L.M.	32	344

Among those who have been lost to the Society by death, the Council have to record with great regret the names of Dr. Stoliczka, late Natural History Secretary of the Society, Dr. Bhau Daji of Bombay, Dr. H. B. Buckle, A. Bond, Esq., and Babu Pulin Behary Sen, a Zemindar of Berhampore.

The election of Col. G. A. Searle was cancelled at his own request.

#### INDIAN MUSEUM.

The Council continue to carry out the provisions of Act XVII of 1866 and transfer all Natural History and Archæological specimens received by them to the Trustees of the Indian Museum.

The Trustees on the part of the Society were Mr. W. S. Atkinson, Col. H. Hyde, Col. J. E. Gastrell, and Mr. J. Geoghegan.

#### FINANCE.

The Financial position of the Society, the Council are happy to report, continues in a satisfactory state; for, with the exception of one item, the receipts from all sources shew considerable increase.

The only falling off is in the item of house-rent, but this is easily explained by the circumstance that last year an accumulation of arrears on this account, amounting to Rs. 12,916, were realized and shown in the account under the head of "Building," while this year the income from this source has only been the regular monthly allowance of Rs. 400 per mensem, or Rs. 4,800.

The only item of expenditure requiring special notice is the sum of Rs. 1,184 for repairing some of the most valuable paintings in the Society's



collection, which were in exceedingly bad order. This was noticed in the report for last year and provision was made for the cost.

It is satisfactory to observe that the expenditure during the year falls short of the amount allotted in the Budget estimate, and that the income exceeds the estimate by upwards of Rs. 1,500.

The Finances of the Society would be in a more satisfactory state if members would be more regular in paying up their subscriptions as they fall due; for instance, in the year under notice, the amount of subscription due from 309 members (140 resident paying at 48 Rs. and 169 non-resident paying at 24 Rs.) was Rs. 11,016, besides Rs. 156 realizable from 13 subscribers in Europe, or in all Rs. 11,172; but the amount actually realized on account of subscriptions was only Rs. 7,500, or Rs. 3,672 less than the proper amount, which is a most serious deficiency. The collection of arrears amounted to Rs. 1,229, making the total receipts on account of subscriptions Rs. 8,729. Though this state of things is most unsatisfactory, it should be noticed that the collections are steadily increasing; they exceed the amount of 1873 by nearly Rs. 450 and that of 1872 by about Rs. 1,250.

The other items of increase are those from the sale of the Society's Journals and other publications, the former sale being in excess of the proceeds of 1873 by Rs. 600 and the latter by about Rs. 100.

The assets consisting of—

Government securities, ...	...	...	Rs. 9,200	0	0
Cash in hand, ...	...	...	„ 161	9	1
Balance in the Bank of Bengal, ...	...	...	„ 6,856	12	2

amount altogether to	...	...	...	Rs. 16,218	5	3
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(exclusive of outstandings amounting to Rs. 8,715, more than two-thirds of which comprise arrears of subscription). Pursuing the plan adopted last year, the Council have funded Rs. 1,500 out of the amount collected from admission fees, and compounding fees from life members.

The following is a Statement of the Receipts and Disbursements of the Society during the last year.

	RECEIPTS. 1873.			1874.		
Subscriptions, ...	...	8,296	2 0	8,729	3	0
Admission fees, ...	...	1,424	0 0	1,182	0	0
Publications, ...	...	1,537	0 3	2,126	8	7
Library, ...	...	316	6 6	412	12	6
Secretary's Office, ...	...	9	3 9	23	12	9
Vested Fund, ...	...	238	4 0	449	0	0
Building, ...	...	12,916	2 1	4,800	0	0
Coin Fund, ...	...	24	0 0	0	0	0
				Rs. 24,761	2 7	Rs. 17,723 4 10



			Brought over,...	17,723	4	10
Sundries,	...	...	...	2,861	4	2
Balance in the Bank of Bengal, 1873,	...	...	...	3,392	14	6
Cash in hand,	...	...	...	393	15	10
				<hr/>		
				Rs...	24,371	7 4

## DISBURSEMENTS.

Publications,	...	...	Rs. 7,270	2	10	7,440	11	8
Library,	...	...	1,518	13	11	2,732	2	9
Secretary's Office,	...	...	2,614	0	4	3,119	8	10
Vested Fund,	...	...	5,975	9	11	1,646	5	5
Building,	...	...	3,539	2	6	919	13	10
Coin Fund,	...	...	0	0	0	266	0	0
				<hr/>				
				20,917	13	6	16,124	10 6
Sundries,	...	...	...	...	...	1,228	7	7
Balance in the Bank of Bengal, 1874,	...	...	...	...	...	6,856	12	2
Cash in hand,	...	...	...	...	...	161	9	1
				<hr/>				
							Rs...	24,371 7 4

There are two items of expenditure shewn below which call for explanation. The amount spent on the Library, exceeding the outlay of 1873 by about Rs. 1,200, includes the expenditure of Rs. 1,134 incurred in repairing and restoring the oil paintings. The excess of Rs. 500 in the establishment of the Secretary's office has arisen from the addition of a new clerk on Rs. 60 a month from the month of August last and extra charges incurred for keeping the Library open on Friday mornings.

The following is the Budget of Income and Expenditure for 1875.

## INCOME.

Subscriptions	...	...	...	Rs. 8,000	0	0
Admission Fees	...	..	...	„ 1,000	0	0
Publications	...	...	...	„ 1,500	0	0
Library	...	...	...	„ 300	0	0
Vested Fund	...	...	...	„ 400	0	0
Building	...	...	...	„ 4,800	0	0
Sundries	...	...	...	„ 500	0	0
				<hr/>		
				Rs.	16,500	0 0



## EXPENDITURE.

Publications	...	...	Rs. 7,500	0	0
Secretary's office	...	...	„ 3,500	0	0
Building repairs	...	...	„ 500	0	0
Do. Taxes	...	...	„ 500	0	0
Coin Fund	...	...	„ 500	0	0
Library	...	..	„ 3,000	0	0
Sundries	...	...	„ 500	0	0
Balance	...	...	„ 500	0	0
			<hr/>		
			Rs. 16,500	0	0

## LIBRARY.

About 1,200 volumes have been added to the library during the year by purchase and presentation, most of which were on scientific subjects, About 500 volumes comprising some valuable Reports and Maps were received from the Government of Bombay.

Several valuable Persian and Sanskrit MSS. and lithographed Sanskrit works have been purchased for the Society at a cost of Rs. 515 and Rs. 1,233 have been laid out for Government in the purchase and copying of Sanskrit MSS. on account of the conservation of Sanskrit MSS.

The collection of Photographs has received some valuable additions during the course of the year including a series of 18 Photographs of the remains at Garhwa; another of 55 Photographs of paintings in the Ajunta, cave besides 11 Photographs, Lithographs, and Photozincographs on miscellaneous subjects, in all 84.

## PUBLICATIONS.

The Journal and Proceedings of the Society published during the year are well up to the standard, both in quantity and the value and interest of the contributions.

The Journal Part I. consists of upwards of 380 pages letter-press illustrated by 19 plates, and nearly 300 pages of Part II. have been published, illustrated by 14 plates. The Proceedings and Meteorological Observations. amount to 400 pages.

## OFFICERS.

Messrs. Blochmann and Wood-Mason have retained charge of Parts I and II. of the Journal, respectively, and of the other duties of their respective Secretaryships. The duties of General Secretary and editor of the Pro-



- Birmingham :—Institution of Mechanical Engineers.  
 Bombay :—Royal Asiatic Society.  
       „       Editor, Indian Antiquary.  
 Boston :—Natural History Society.  
 Bordeaux :—Bordeaux Academy.  
 Buenos Ayres :—Public Museum.  
 Bruxelles :—Académie Royale des Sciences.  
 Cherbourg :—Société Nationale des Sciences Naturelles.  
 California :—Academy of Arts and Sciences.  
 Calcutta :—Agricultural and Horticultural Society of India.  
       „       Geological Survey of India.  
 Christiania :—University.  
 Copenhagen :—Royal Society of Northern Antiquaries.  
 Cambridge :—University.  
 Dacca :—Editor, Bengal Times.  
 Dehra Dún :—Great Trigonometrical Survey.  
 Dublin :—Royal Irish Academy.  
       „       Natural History Society.  
 Edinburgh :—Royal Society.  
 Geneva :—Physical and Natural History Society.  
 Königsberg :—Physical and Economical Institution.  
 Lahore :—Agricultural Society of the Panjáb.  
 Leipzig :—German Oriental Society.  
 Liège :—Royal Society of Sciences.  
 Leyden :—Royal Herbarium.  
 Liverpool :—Literary and Philosophical Society.  
 London :—Royal Society.  
       „       British Museum.  
       „       Royal Asiatic Society of Great Britain and Ireland.  
       „       Royal Institution.  
       „       London Institution of Civil Engineers.  
       „       Royal Geographical Society.  
       „       Museum of Practical Geology.  
       „       Zoological Society.  
       „       Statistical Society.  
       „       Geological Society.  
       „       Linnean Society.  
       „       Editor, Athenæum.  
       „       Anthropological Society.  
       „       Editor, Nature.  
       „       Royal Astronomical Society.  
       „       Editor, Geographical Magazine.



Lyon :—Agricultural Society.  
 Moscow :—Society of Naturalists.  
 Madras :—Government Central Museum.  
 „        Literary Society.  
 Manchester :—Literary and Philosophical Society.  
 Munich :—Royal Academy.  
 Netherlands :—Royal Society.  
 New Haven :—Connecticut Academy of Arts and Sciences.  
 Oxford :—Bodleian Library.  
 Paris :—Imperial Library.  
 „        Anthropological Society.  
 „        Asiatic Society.  
 „        Geographical Society.  
 „        Ethnological Society.  
 Stettin :—Entomological Society.  
 Stuttgart :—Natural History Society of Wurtemberg.  
 St. Petersburg :—Imperial Library.  
 „        Imperial Academy of Sciences.  
 Stockholm :—Royal Academy of Sciences.  
 Turin :—Academy.  
 Vienna :—Imperial Geological Institute.  
 „        Anthropological Society.  
 „        Zoological and Botanical Society.  
 „        Imperial Academy of Sciences.  
 Washington :—Smithsonian Institution.  
 „        Commissioners of the Department of Agriculture.

#### COIN CABINET.

The Coin Cabinet of the Society received during last year several valuable additions by purchase, *viz.* a unique gold coin of Husain Sháh of Bengal and a collection of twenty-five gold, silver and copper coins of Khoqand, Káshghar, and Eastern China.

On the motion of the President, the Report was adopted.

The Scrutineers reported the election of Officers and Members of Council for 1875, as follows :

The Hon'ble E. C. Bayley, C. S. I.	<i>President.</i>
Bábu Rájendralála Mitra.	} <i>Vice-Presidents.</i>
Col. H. Hyde, R. E.	
Dr. T. Oldham.	



This part of the Journal has contained several other valuable papers, among others that on Duplex Telegraphy by Mr. Schwendler.

Turning to Physical Science, I would briefly notice the progress of those branches that have been before this Society and such proceeding as may be of interest.

*Duplex Telegraphy.*—During the past year all the difficulties that hitherto stood in the way of the practical application of Duplex Telegraphy have been overcome, the system has been introduced and is working on the Indian lines with perfect success.

The *double balance* method was introduced on the 28th June, on one of the main lines CALCUTTA—BOMBAY (1,600 miles,) since which date and during the worst season of the year (south-west Monsoon) this method has worked with great regularity and speed, and has carried nearly the whole of the traffic between the two Presidency towns.

In a few days another main line, BOMBAY—MADRAS, will be worked by this system, and it is probable that before the lapse of the current year, the whole of the main traffic in India, CALCUTTA—RANGOON included will be carried on this system.

Experiments made at Bombay in July, with the BOMBAY—ADEN cable (1,800 knots in length) have conclusively proved that Duplex working with the "*double balance*" method is also practicable on cables and it is to be hoped that the Companies concerned will soon avail themselves of it, with a view to increase the speed and reduce the charges.

It has been mathematically demonstrated and confirmed by practice that the "*double balance*" method fulfils all the necessary conditions to bring Duplex Telegraphy on a par with single Telegraphy.

This method not only allows the balancing in the one station to be effected without interfering with the balance of the distant station, but it ensures, that unavoidable variations in the resistance of the line shall have the least possible effect in disturbing that balance, and that all the other conditions such as maximum receiving currents, and the maximum magnetic effect of these currents shall be simultaneously fulfilled with it.

In addition to these great advantages an automatic system of adjusting the disturbed balance may be introduced, whence it follows that Duplex working must be entirely on a par with single Telegraphy, and that wherever single Telegraphy is possible, Duplex Telegraphy is equally practicable.

Thus one of the great standing problems in Telegraphy has been satisfactorily solved on the large main lines of India, and the practical solution of the second problem for long submarine cables, it is expected will soon follow.

The saving in outlay (capital) is very clear, for instance—at present there is only one wire between Calcutta and Rangoon. The increase of



traffic on this line has of late been so great that the question of putting up a second wire had to be considered.

The cost of this second line would have been about Rs. 4,00,000, but this expenditure will be avoided by the introduction of the Duplex arrangement, which will give equal capacity for traffic at a cost of about Rs. 4,000.

In addition to this, there are many technical advantages connected with the Duplex system of which it is necessary to mention the entire elimination of contacts and of the effects of Voltaic induction which is so much felt on long direct-worked circuits.

*Action of Light on the Electrical Resistance of Selenium.*—This is a most important discovery. It has been ascertained that the electrical resistance of crystalline selenium decreases considerably with the intensity of light shining on the selenium.

With a view to investigation on this head I have had an arrangement made for perfectly insulating a bar of selenium in a box, which can be opened and closed at pleasure from any distance of the observer, and Mr. Schwendler has already made some qualitative experiments with the apparatus verifying Lieut. Sale's and Earl Ross's experiments, *i. e.*, that the effect is due to *light* and not to conducted or radiated heat.

He found that the decrease of resistance of the pieces of selenium experimented with, is unmistakable, since it represents a variation up to 67 per cent. between darkness and the light of an ordinary kerosine lamp shining on it at a distance of about 13 inches.

It is our desire to find by careful experiments, to which the very perfect electrical apparatus at the Government Telegraph Store-yard is so eminently applicable, the law which connects the variations of resistance with the intensity of the light.

Mr. Schwendler expresses a belief that other similar substances, as for instance, sulphur in its two different states, would shew a similar effect, only, that it is more difficult to shew it, on account of the very small absolute conductivity sulphur possesses.

It is scarcely necessary for me to call your attention to the great future usefulness of this discovery (which is quite independent of its most interesting nature in revealing another co-relation of forces) I mean for the construction of a rational Photometer for which such a great want is felt and which does not at present exist.

In fact with this practical object in view, I secured the bar of selenium and constructed the apparatus mentioned.

*Unit of Electrical Resistance.*—Professor Kohlrausch has shewn that the British Association unit contains a probable error of about 2 per cent. and therefore, as the Siemens or mercury unit approaches the multiple absolute or Weber's unit, of which the British Association unit is to be a



representative, as closely as 3 per cent. Kohlrausch proposes that the Siemens unit should be introduced as the material standard for reference, especially as the Siemens unit is capable of such accurate reproduction, as has been shewn by different observers at different times, the error of reproduction of the Siemens unit exceeding scarcely half per mille. This material standard might then be expressed from time to time in absolute measure for scientific purposes. Its value would then be known more and more accurately in absolute measure in proportion as the methods of determination increase in accuracy, and by this proceeding endless confusion in future might be avoided.

Mr. Siemens when proposing his unit had foreseen most clearly all these difficulties connected with the production of a standard in absolute measure. Further his unit being so easily understood and having already attained such a wide extension in all electrical measurements. Professor Kohlrausch's proposals are very much to the point.

*Electromotographs.*—Another, and entirely new, discovery in Telegraphy has been made during the last year by Mr. T. A. Edison, of Newark.

The instrument is based on the newly discovered fact that when an electric current, even the weakest which would not be able to deflect even a very delicately suspended magnetic needle, passes through paper prepared in the ordinary manner as is used for the chemical telegraphs, the surface becomes changed, *i. e.*, where the current has passed, it becomes smooth, while in the other parts, where no current has passed, the paper keeps its original surface. This is the case, as already stated for the weakest possible currents, which would not even be able to produce coloration by electrolysis. Thus if a lever is introduced in the proper manner and is made to pass over these unreadable signals, the lever slides upon the paper, as upon ice when passing over a signal, but when no signal is under it, the lever is carried forward by the friction of the paper producing a certain motion of the lever which by the application of local batteries is made to reproduce the message in a readable manner.

It will be clear that no electro-magnets being used, the speed of receiving a message is only limited by the induction capacity of the line and by nothing else, and moreover the weakest possible currents being sufficient to produce this peculiar state of the paper, such a telegraph will work when all the present known ones would cease to function.

Mr. Edison finds that paper prepared with potassic hydrate is the best material for producing the required effect on the paper. This system in continuation with the now perfectly practicable Duplex working will raise the carrying capacity of the telegraph line to such an enormous extent that we may well expect to defer indefinitely the construction of new lines where old ones do already exist.



The result will obviously tend to lower the tariff to such rates as will hereafter enable telegraph communication to be used as a rule in many ordinary transactions, instead of as at present in exceptional cases only.

Mr. Schwendler informs me that he has the matter under close consideration, and hopes to be able during this year to lay before you his experimental results.

*Transit of Venus.*—From time to time the Society has been informed of the arrangements that were being made for observing the transit of Venus in this country. There has not been sufficient time to obtain the result, but I may note that Col. Tennant's party have been most successful, 107 six-inch Photographs and 5 Janssen plates have been taken, while in Calcutta 39 Photographs were taken.

*Zoological Garden Scheme.*—I regret to state that this question has not advanced during the past year.

The Committee appointed for the purpose resolved to adjourn the meetings until the calls on the Government for the present extraordinary expenditure were over.

In addition to this the difficulty of providing a suitable locality has acted as a check and since this no action has been taken.

I may, however, express again my opinion how desirable it would be to have an institution of the kind for the Capital of India, an institution which if put on a proper rational footing would be especially cherished both by the European and Native communities and which I trust will have the attention of both Imperial and Local Governments as an institution that will contribute largely towards education and the recreation of the public, and which can be very usefully connected with an acclimatising establishment of animals.

*Earth Currents.*—In my last annual report I mentioned this interesting question at some length. Action has been taken on Mr. Schwendler's suggestions and the Earth-current Committee assembled for the first time on the 2nd February, when it was resolved to draw up a detailed scheme based on the preliminary report of the Select Committee which was prepared in June last year.

This final scheme will then be laid before the Government of India for sanction.

The very great importance of a system of Earth-current measurements has been mentioned by Sir Wm. Thomson in his last annual address to the Society of Telegraph Engineers and has been also clearly indicated in a paper read before this Society in June last, from which it is most satisfactory to learn that we shall begin our work resting on a basis consisting of more than 10,000 quantitative measurements made all over India, Ceylon included, during a period of more than 7 years. These large number of observations wait only calculation and compilation.



I may here express my sincere wish that the Government of India may assist and that the machinery of the Government Telegraph Department may be employed to take the necessary observations with a view to the same being placed at the disposal of the Earth-current Committee, and the result published in the Society's Journal.

During the past year we have received the fourth volume of General Cunningham's Reports on the Archæological Survey of India and it fully maintains its character.

We have also received the first part of the new Marsden, which is mainly devoted to ancient weights and measures. It treats of ancient Indian weights and the actual value of the Tola is very ably and fully discussed.

Another book I have to mention is Bábu Rajendralála Mitra's first Volume of the Antiquities of Orissa. In 1868, the Government of India, at the suggestion of the Royal Society of Arts, assigned a large sum of money for the purpose of obtaining casts of some of the more important sculptures of ancient India. A part of this sum having been made over to the Government of Bengal, a number of Modellers and Photographers were sent to Orissa, and Bábu Rajendralála Mitra accompanied them as Archæologist. The book therefore, is the result of the Babu's labours in connexion with this mission. It treats of the Orissa, Jain, and Bengal temples, and their architectural details, and contains a most interesting chapter on the state of civilisation of the people of ancient Orissa, deducible from their sculptures. The dress, ornaments, household furniture, carriages, arms, musical instruments, &c., of the ancient Uriahs are minutely described, depicted, and compared with the sculptures on other architectural remains, including those preserved in the Society's Museum. The book closes with a valuable dissertation on Buddhism, Sivaism and Vaishnavism, with special reference to Orissa Architecture. The work contains no less than thirty-six lithographs, and over fifty wood cuts, nearly all of which have been executed by students of the School of Arts, and though I have had only time to glance at the contents of the work, it having been issued this very evening, I have no doubt that it forms the most important addition to our knowledge of ancient Orissa, and fully maintains the reputation of its author. I sincerely hope that Bábu Rajendralála Mitra will soon bring out the second Volume, which is to contain a minute description of the antiquities of Khandagiri, Bhuvaneswar, Puri, Kenarak, Cuttack, Alti, Jájjipur, and Balasore.

It only remains for me to announce the conclusion of the business of this Annual Meeting, and, thanking you for the support I have received for the past year, I have to resign the chair to our newly elected President.

The Meeting was then resolved into an ordinary Monthly General Meeting.



The Hon'ble E. C. Bayley, C. S. I., President, in the chair.

Mr. Bayley expressed his sense of the honour which the meeting had conferred on him in electing him as President of the Society. He thought he could make no better use of his position than by asking the meeting to express their thanks to the outgoing President and Council for the very able and unusual care which they had given to the affairs of this Society, a care to which the condition of the Society, its journals, and its finances bore testimony. He trusted that while he held the office of President, the same course of prosperity might attend the Society, and he further hoped that before it terminated they would be comfortably installed in their new quarters at the Indian Museum.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table—

1. From Dr. J. F. N. Wise a silver coin of Islam Shah. A. H. 954.
2. A copy of Captain Pogson's Narrative of a Tour to Chattergaon.
3. From Dr. F. Jagor. A copy of "Reisen in den Philippinen" and a copy of "Travels in Singapore, Malacca and Java."
4. A copy of "Microscopical notes regarding the Fungi present in Opium Blight," by D. D. Cunningham, M. B.—From the Author.
5. A Report of "Microscopical and Physiological researches into the nature of the agent or agents producing Cholera." By T. R. Lewis, M. B. and D. D. Cunningham, M. B.—From the Authors.
6. A copy of "The Pathological Significance of Nematode Hæmatozoa," by T. R. Lewis, M. B.—From the Author.

The following gentlemen duly proposed and seconded at the last meeting were elected ordinary members.

J. Armstrong, Esq., Surgeon, Bengal Army.

R. S. Whiteway, Esq., C. S., Moradabad.

J. Smidt, Esq., German Consul.

W. J. Porter, Esq., Arrakan.

The following are candidates for ballot at the next meeting.

Dr. T. Hendley, Civil Surgeon, Jeypore, proposed by Mr. Adam, seconded by Captain J. Waterhouse.

J. Douglas, Esq., Assistant Superintendent, Government Telegraph Department, proposed by Mr. Schwendler, seconded by Col. Hyde.

Walter Dodgson, Esq., Kalliganj, Rangpur, proposed by Mr. J. Wood-Mason, seconded by Mr. G. Nevill.

The Secretary reported that Major-General J. Y. Gowan, announced at the last meeting as withdrawing his name from the Society, has since expressed a desire to continue a member in Europe.



The following gentlemen have intimated their desire to withdraw from the Society.—

Col. O. Hamilton.

W. Heilgers, Esq.

S. C. Bayley, Esq.

Mr. Bayley laid before the Society a series of 36 photographs from the Sculptures discovered by General Cunningham at Baráhut. These by no means represented the whole of the sculptures—but were specimens only of a few of the most interesting. The sculptures themselves were now, he hoped, on their way to Calcutta, as they had been liberally presented to the British Government by the Rajah of Nagode and his kinsman the Thakur of the place in which they were discovered.

There had already been notices of the general character of these sculptures; and descriptions of some of them, from General Cunningham's own pen, were before the Society. The sculptures were part of the decorations of an ancient "Stupa" and its appendages, and until General Cunningham commenced his researches had been practically lost. In fact the only trace of them was an inscription on one pillar which, mentioned by Col. R. Ellis, had drawn the attention of General Cunningham to the spot—on re-discovering the place he visited it, and seeing prospects of success in digging proceeded to disentomb these sculptures which were entirely covered with earth.

The value of the resulting discovery had been gladly acknowledged by men of the highest learning in Europe, as might be seen by the Numbers of the Academy which he had before him, and which were accessible to the members of the Society.

The present collection included certain representations of various occasions in the life of Buddha or belonging to the stages of his existence anterior to his last appearance as Sakya Muni—particularly there was a curious representation of the purchase of the ground for the Jelavana monastery; there were certain figures of Nagas and Yakshis, male and female, connected with Buddha's history, and sundry other sculptures, particularly a series of "bodhis" or sacred trees—from which it would appear that various kinds of trees were sacred to the various Buddhist saints.

Professor Minayeff of St. Petersburg, whom he would take the liberty of introducing to the Society, would explain to them that this was in exact accordance with the statements of an ancient Buddhist MS. purchased by him in Ceylon and that the attribution of each tree in the sculptures agreed with the enumeration given in the MS. in question.

The following papers were read:—



1. *On a Copper-plate Inscription of the time of Skanda Gupta.* By BA'BU RA'JENDRALÁLA MITRA.

The plate has been found at Indor, a small village near Anopshahar on the Ganges. It records an order of one Devavishnu, a petty zemindar of the place, directing the guild of oil-sellers of Indrapur to supply daily a sufficient quantity of oil for the use of the temple of the sun at that place, the supply being increased by two ounces and three drachms on every new-moon day. The order was issued in the month of Phálguṇa of the year 146, during the reign of Skanda Gupta. This date is at variance with the generally received interpretation of the Kuháon pillar inscription, according to which Skanda Gupta had died before 141 year of the same era; but the author of the paper contends that that interpretation is wrong, and shows at length that the word which implies "extinction" in that record, does not apply to the kingdom, or to the king, but to the year on the expiry of which the occurrence mentioned took place. He is of opinion also that the era used in the several Gupta inscriptions which have come to light is the Sáka, and not the Samvat nor the Ballabhi era.

Mr. Bayley observed that the Society were indebted to the learned Bábu for his lucid explanation of the phrase containing the date of this inscription, which he believed was in accordance with a tentative reading already made by General Cunningham and which had been assented to by several pandits. It was to say the least on the face of it a more probable rendering of the phrase than that which had hitherto been commonly accepted. For himself also he perfectly agreed in the attribution of the Gupta dates to the Saka era. This suggestion too had been anticipated by General Cunningham\* in his remark at the 4th page the 3rd of Vol. of the Archæological report, and if this was so, he thought it was quite possible to give a complete interpretation to the account of the Arabic historian quoted by the Bábu. According to that passage while the Gupta era dated from the era of their destruction it was shown also to be exactly the same as the Balabhi era, dating from the establishment of the Balabhi dynasty, it seemed probable that Gupta and Balabhi were really merely two differing names for the same era given according as it was viewed as dating from one event or the other, which were in fact concurrents. The fall of the Guptas being produced by the success of the Balabhi kings. It was not a wholly unprecedented fact that an era should be dated from the destruction of a dynasty, for we know that the Saka era took its date from the victory in which a Saka invader was slain, and the successes of his followers were checked finally, or at any rate for a long series of years.

\* And it may be fair to say that this era was suggested as possibly identical with the Gupta era by Mr. Thomas in Prinsep's *Essays*, Vol. I, p. 276.



But while going so far with the Bâbu, he must wholly demur to his conclusion that the Kanishka dates belonged to the same epoch, and were part of the same series of dates. No doubt there was a Kanishka date of the 9th Sambat, and no doubt also one of Chandra Gupta of the 93rd year, but it was palpably impossible that they should belong to the same series of dates, for with the Mathura and other inscriptions we had now a clear series of dates of Kanishka and his successors Havishko and Vasu Deva (the Boz Deo of the Indo-Scythians) the dates of the latter coming as low as Sambat 96.

Now we had Chandra Gupta's date of 93 and these two dates would overlap, and there would be not only this difficulty, but supposing the Sanda inscription with this date to be that of Chandra Gupta the first, there would yet be no place for the two kings who we know preceded Chandra Gupta I, viz., Sri Gupta and Ghatot Kacha. There was nothing however, to show that this inscription really belongs to Chandra Gupta the first. Indeed General Cunningham on apparently good grounds assigned it to Chandra Gupta the second,\* in which case no less than four previous kings would have to be provided with a place in the series!!

Mr. Bayley stated that his own belief was, that the dates of the Kanishka dynasty referred to an earlier era, which he believed to be the Vikramaditya era, he had some time since come to this conclusion from his own enquiries, without being aware that General Cunningham had anticipated him, though he differed from the learned General in believing that this era took its rise from the occasion of Kanishka himself and not from that of Volumokadpheses as General Cunningham held.

He thought it was probable, as he understood was General Cunningham's belief also, that the Guptas first superseded the Indian branch of the Indo-Scythian invaders; those who came down to the eastward and were in consequence involved in a contest with the Western branch of the Indo-Scythians situated as we know from many authorities in the Western Punjab and Scind, and that the great victory from which the Saka era took its rise was one in which the leader of the Western Indo-Scythians† was defeated and slain by one of the Gupta kings possibly either Ghatot Kacha or Chandra Gupta the 1st. The latter certainly adopted the title of Vikramaditya, while on a coin of the former he was described as the conqueror of the "Ansu"‡ at least as Professor Hall reads the somewhat doubtful legend. In either case, if the Vikramaditya era answer to the Kanishka era Sri Gupta would

\* As a matter of fact, General Cunningham assigns a Gupta inscription at Garhwa in the Allahabad district not without some grounds dated in 86 to Chandra Gupta II.

† I doubt if any of the Guptas or at least the early kings of that dynasty ever established their rule in any part of the Panjab or even in the northern extremity of the Doab.

‡ Anenz Asii? cf. C. Arch. Reports, Vol. II, p. 43.



have to be placed between 96 of that era, in which year Vasu Deva was also reigning, and the commencement of the Saka era, that is A.D. between 39 A.D. and 78 A.D. and if Cunningham's attribution of the Garhwa inscription dated in 86 to Chandra Gupta the second be correct, there would be about 86 years for the five next kings viz., Ghatot Kacha, Chandra Gupta I, Samudra Gupta and 60 years from 86 to 146 the date of the Eran inscription for Chandra Gupta II. Kumara and Skanda Gupta, or 146 years for six kings or an average of over 25 years each. This is no doubt a somewhat long but by no means impossible average, though no doubt it indicates a period also of comparative freedom from internal discord, a period of peace and prosperity, as indeed from the comparatively numerous coins and inscriptions of the Gupta Dynasty seemed very probable. In fact save for a short period in the middle of the first century A.D. India would seem to have enjoyed comparative tranquillity from 57 B.C. to towards the end of the first quarter of the 3rd century.

Bábu Rájendralála Mitra said, that as he had not entered into the subject of the Kanishka dates in his paper and had only referred to them casually in his verbal remarks, it was not necessary for him to discuss it at length. He thought, however, that the question of the era of Kanishka's records was still an open one. In all the inscriptions of that sovereign, the era is indicated by the syllable *व*, which may be an abbreviation of the *Samrat* of Vikramáditya, or of *Samvatsara*, the Sanskrit for a year, and there was therefore ample room for discussion. Extraneous evidence might or might not be forthcoming to settle the doubt, but the fact of the earlier dates of the Indo-Scythians falling in with the later ones of the Guptas was a remarkable one and needed careful enquiry. The earliest known date of Chandra Gupta was 87, the latest of Kanishka 47, the earliest 9. One of the Mathura inscriptions gives 44 for the date of Vasudeva, so he cannot be called a successor of Kanishka. There were two predecessors of Chandra Gupta of the Gupta line, and it was questionable whether the period of their united reigns would just fill in the gap between the known dates of Kanishka and Chandra Gupta. But it was quite immaterial whether it did so or not, as the Indo-Scythians reigned in a very different part of the country from where the Guptas exercised their power. It had been said that the fact of Ghatotkacha calling himself a destroyer of Asuras implied that he came after the overthrow of the last successor of Kanishka; but the assumption was not tenable, as the founder of the *Samvat* era also called himself a destroyer of the S'akas, and he lived before Kanishka flourished in India. Bábu Rájendralála Mitra did not, however, wish to press the question, as he did not think that sufficient materials were at hand to come to a satisfactory conclusion.



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THE AUTHOR.

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#### *Purchases.*

Comptes Rendus, Nos. 14-17.

No. 14. *M. P. Lagrange* propose l'emploi du poly sulfure de baryum.—*M. le Ministre des Affaires Etrangères* transmet quelques détails Complémentaires au sujet de la récente éruption de l' Etna. *M. E. Mercadier*—E'lectro-diapason à période variable. *M. M. B. Delachanal et A. Mermet*—Tube spectro-électrique destiné à l'observation des spectres des solutions métalliques. *M. G. Tissandier*—Observations Météorologiques en ballon. *M. W. de Fonvielle*—Note sur des observations spectroscopiques faites dans l'ascension du 24 Septembre 1874, pour étudier les variations d'étendue des couleurs du spectre.

No. 15. *M. A. Leroy et M. Granjon* adressent des Notes sur la navigation aérienne. *M. G. Tardani* adresse un Memoire relatif au Cholera.

No. 16. *P. Secchi*—Observation de l' éclipse solaire du 10 Octobre 1874, avec le spectroscopie. Tableaux des observations des protubérances solaires, du 26 Décembre 1873 ou 2 août 1874. *M. N. Lacoudret* adresse une Note relative à la direction des ballons. *M. C. Jordan*—Généralisation du théorème d'Euler sur la courbure des surfaces. *M. M. C. Paquelin et L. Jolly*—La matière Colorante du sang (hématosine) ne contient pas de fer.

No. 17. *M. Th. Du Moncel*.—Huitième Note sur la conductibilité électrique des corps médiocrement conducteurs. *M. A. Léard* adresse un Mémoire sur un appareil de télégraphie optique, de jour et de nuit, à l' usage des armées encampagne.

Journal des savants, Octobre 1874.

Revue et Magasin de Zoologie, 1874, Nos. 7-9.



Revue Archéologique, Oct., Nov. 1874.

Octobre, Nov., *M. G. Conestabile*—De L' Inhumation et de L' Incinération chez les Etrusques.

Revue des Deux Mondes, 15 Oct.—1st Nov. 1874.

1st Nov., *M. P. Janet*—La Science Sociale et la Philosophie Anglaise.

The Quarterly Review, 1874, October.

The Edinburgh Review, 1874, October.

The Ibis, Vol. IV, No. 16.

*H. E. Dresser and W. T. Blanford*—Notes on the specimens in the Berlin Museum collected by Hemprich and Ehrenberg. *A. R. Wallace*—On the arrangement of Families constituting the Order Passeres. *P. L. Sclater*—Dr. A. B. Meyer's Ornithological Discoveries in New Guinea. *H. E. Dresser*—On a new species of Marsh-Warbler. *R. Swinhoe*—Ornithological Notes made at Chefoo (Province of Shangtung, North China). Obituary Notice of Dr. Stoliczka.

The American Journal of Science, Vol. VIII, No. 46.

The London, Dublin, and Edinburgh Philosophical Magazine, Nos. 319, 320.

No. 319. *Sir. W. Thomson*—On the perturbations of the Compass produced by the rolling of the ship. *A. M. Mayer*—Researches in Acoustics, No. V.

No. 320. *A. M. Mayer*—Researches in Acoustics No. V.

The Annals and Magazine of Natural History, Nos. 83-84.

No. 83. *Professor Allman*—Notes on the structure and development of *Myriothela phrygia*. *H. J. Carter*—Development of the Marine sponges from the earliest recognizable appearance of the Ovum to the perfected individual. *Dr. A. Günther*—Description of a remarkable kind of Air-bladder. *Dr. J. E. Gray*—List of the species of Feline Animals. *W. C. Hewitson*—A list of Butterflies with descriptions of new species from the Andaman Islands. *J. Scott*—On a collection of Hemiptera Heteroptera from Japan. Descriptions of various new Genera and Species. *A. G. Butler*—Descriptions of new species of *Sesia* in the collection of the British Museum. *Dr. A. Günther*—Descriptions of new species of Fishes in the British Museum. *R. B. Sharpe*—Description of a remarkable new Pheasant from Borneo. *Dr. J. E. Gray*—On the colour of the Kittens of the Species of Cats. *M. A. Giard*—On the Ethology of *Sacculina carcini*.

No. 84. *H. J. Carter*—Development of the Marine Sponges from the earliest recognizable appearance of the Ovum to the perfected individual. *W. T. Blanford*—Description of a new *Helix* from Southern India. *J. Scott*—On a collection of Hemiptera Heteroptera from Japan. Descriptions of various new Genera and species. *Dr. A. Günther*—Descriptions of new species of Fishes in the British Museum. *E. R. Lankester*—Note on the *Planula* or *Gastrula*-phase of Development in Mollusca. *W. T. Blanford*—Note on *Ablepharus pusillus*.

Journal of the Society of Arts, XXII, Nos. 1143-1150.

The Numismatic Chronicle, 1874, part 3.

Conchologia Iconica, parts 318-319.

Solecirtus, Petricola, Physa, Astarte, Venerupis and Pandora.

The Calcutta Review, 1875, January.

*G. R. C. Williams*—Historical sketches, part I. The Sikhs in the Upper Doab. The Royal Asiatic Society. Ritual and Ritualism. *G. W. Cline*—The Portuguese in Western India.



Stray Feathers, Vol. III, Nos. 1, 2, 3.

A first list of the Birds of Upper Pegu. *V. Ball*—Notes on some birds observed in the Suliman Hills. *W. V. Legge*—Additions to the Avifauna of Ceylon and Notes on various species found there. *J. Gammie*—On the breeding of *Aceros nipalensis*. *J. Aitken*—The Swallows and Swifts of Berar. *The late Dr. F. Stoliczka*—The Avifauna of Kashgar in Winter. *W. V. Legge*.—On *Dromas ardeola*. *W. E. Brooks*—Notes upon a collection of birds made between Mussoori and Gangotri. What is a species? Notes on *Arborophila mandellii*, *Locustella lanceolata* and sub-signata, *Brachyurus megarhynchus* found in the delta of the Irrawaddy during summer, *Munia pectoralis*, Books and papers received, Nestlings of *Palæornis fasciatus*, *Cuculus micropterus* in the Andamans. Letters to the Editor. *V. Legge*—*Tringa albesens* in Ceylon and on the West Coast of Australia. *J. Gammie*.—On eggs of *Leiothrix callipyga*. *M. F. Coussmaker*—*Rhynchæa bengalensis* breeding in December. *F. Wise*—*Pterocles coronatus* in southern Sindh. *J. C. Parker*—*Cursorius coromandelicus* found in Lower Bengal. *F. R. Blewitt*.—*Pterocles alchata* found in the Gurgaon District.

The Indian Antiquary, for January 1875, part 38.

*Professor C. H. Tawney*—Metrical translation of the Nitisatakam of Bhartrihari. *Captain J. S. F. Mackenzie*—Tree and Serpent worship. *H. Blochmann*—Persian Inscriptions from Belgam, Sampgam, Gulbarga, and Siddhapur. *Colonel H. Yule*—Mali-futtan. *Rev. E. T. Cole*—Santhali Folklore. *M. J. Walhouse*—Archæological Notes. *G. H. Damant*—Notes on Hindu Chronograms. *Rev. F. Kittel*—Old Kanarese Literature. The God Vihobá of Pandarpur. On the Catholics of Western India. Agaris.

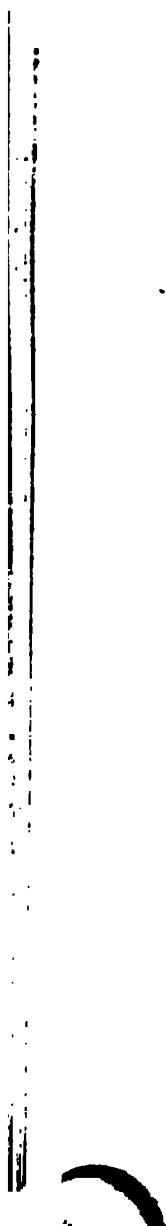
The Indian Annals of Medical Science, No. 33.

*Exchange.*

The Athenæum, October 1874.

Nature, Nos. 266-269.







PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR MARCH, 1875,

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The monthly General Meeting of the Asiatic Society was held on Wednesday the 3rd instant at 2 o'clock P. M.

Bábu Rájendralála Mitra, Vice-President, in the Chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table:

- 1 A Catechism in Romanised Bengali printed in 1734. From H. Beveridge, Esq., C. S.

The following letter accompanied the donation:

I herewith send you the book I spoke about. The title page is missing but the certificate at the beginning tends to show that the book was composed at all events at Bhawal (in the Dacca District) in 1734.

The Catechist also says at the beginning that he lives in Bawal or Bhawal in the place called Nagori and which is still the seat of a church.

The book was given to me by Mr. Santa Maria the priest at Silpur in Backergunge. The Asiatic Society is welcome to the volume if it wishes to keep it.

Mr. Blochmann said, the book was of great interest as a first attempt at transliterating Bengali into European languages.

2. A copy of Record of Meteorological observations kept at St. Xavier's College during 1874. From Fr. Lafont.

3. One Cross-bow and one Gown used by the Khying people, Sandoway. From Major G. E. Fryer.

4. An engraved gem worn as a charm and 14 Muhammadan coins; 2 Bactrian, 1 Hindu (all silver) and 1 copper coin. From Col. F. W. Stubbs, Lucknow.



Mr. Blochmann said—The eighteen coins presented by Col. Stubbs consist of 2 silver Bactrian coins (one a cast of a Sophytes with the cock); 2 Hindu coins, one a silver Kanauj coin, the other copper; 2 silver coins of Sháhrúkh Bahádur, dated 828 and 837 A. H.; 2 silver coins of Abul Ghází Sultán Hussain Mirzá Bahádur, one struck at Astrábád, and the other at Harát in 898 A. H.; 2 silver coins of Alá-uddin Abul Muzaffar Muhammad Sháh, of Dihli, of 710 and 714 A. H.; 1 Jahángiri rupee, struck at A'grah in the 10th year; 1 Alamgir rupee, of the 1st year; one small modern silver coin struck by Sayyid Muhammad Khudayár, the Khán of Khoqand;\* and 5 small illegible silver coins, of which 2 belong to Kábul.

5. A MS. copy of Ayodhya Máhátmya. From Babu Ram Narain, 3rd master, Bareilly College.

The following gentlemen duly proposed and seconded at the last meeting were ballotted for and elected ordinary members.

Dr. F. Hendley, Civil Surgeon, Jeypore.

J. Douglas, Esq. Assistant Superintendent Government Telegraph Department.

Walter Dodgson, Esq., Kallygunge, Rungpore.

The following are candidates for ballot at the next meeting.

Major Lord Ralph Kerr, Mathura, proposed, by Mr. F. S. Growse, seconded by Capt. J. Waterhouse.

Capt. E. N. D. La Touche, Assistant Commissioner Samaguting, Assam, proposed by Capt. J. Waterhouse, seconded by Mr. H. Blochmann.

Dr. A. J. Wall, Bengal Medical Service, proposed by Dr. Waller, seconded by Dr. T. Oldham.

Mr. H. M. Durand of Bhagalpur has intimated his desire to withdraw from the Society.

The President reported that the Council have nominated Dr. S. B. Partridge as a Trustee of the Indian Museum on behalf of the Society.

The Secretary read the following letter from the Revd. E. Lafont on the subject of the erection of a Spectroscopic Observatory at St. Xavier's College.

DEAR SIR,—I propose to erect a Spectroscopic Observatory at St. Xavier's College, where daily observations and mapping of the solar protuberances will be made. As this undertaking is entirely for the benefit of Science, I venture to request the assistance of the Society, in the shape of subscriptions towards the fund for the building and instruments necessary for the intended Observatory. I have every reason to believe that the Government of Bengal will subsidise my scheme if I realise a sufficient sum by private subscriptions.

\* Khoqand (generally called Khokan on European maps) is always called on coins "Khoqand i latif," 'the pleasant Khoqand.'



Will you be so kind as to place my present request before the Council of the Society for consideration and have it also notified to those Members who may feel disposed to contribute to this eminently useful work.

I may mention that a rough estimate of the outlay, fixes the lowest limit at Rs. 10,000, of which one half at least is to be covered by private contributions.

I have the honour to be,

Dear Sir,

Your most obedient servant,

E. LAFONT,

*Rector St. Xavier's College.*

*Calcutta, February, 9th 1875.*

The President reported on the part of the Council that they recommended a grant of Rs. 500 be given to Father Lafont towards the expense of setting up the proposed Observatory.

The motion was put to the vote and unanimously carried.

Father Lafont said—

It is, I think, useless to dwell on the importance of the spectroscopic study of the Sun, but it may be necessary to explain before you, how I came to what may look a rather ambitious undertaking, being a mere tyro in a department of science so novel and difficult as that of the physical constitution of the Sun. The very names of those who went before me, might have frightened me out of the way; Lockyer, Huggins, Secchi and Qacchini are great men and it is somewhat presumptuous on my part to attempt even to follow them. Had it not been for the pressing invitation of my friend Professor P. Tacchini I would never have dreamt of establishing a Spectroscopic Observatory with the very scanty knowledge of Astronomy I possess. But when the eminent founder of the Italian Spectroscopic Society reassured me and explained to me that the work was more that of a physicist than of an astronomer I confess I yielded with pleasure and promised to do every thing in my power to carry out his views. I received encouragement from all to whom I communicated my plans, and His Honor the Lieutenant-Governor having promised his assistance, a subscription was opened, and I am happy to say is now more than half filled. I hope to receive the encouragement of this Society and with the help of those members who would have been better qualified than myself for the work, I am confident to realise the sanguine expectations of the patrons of my scheme. I may be permitted to say that the stability of the Observatory is guaranteed by the conditions communicated in the Bengal Government order for the grant-in-aid, conditions proposed by me in order to satisfy every one as to my earnestness of purpose. In conclusion, gentlemen, I beg to state



that when the Instruments are ready for use, any member of the Society willing to take observations, shall be welcome to the St. Xavier's Observatory.

The Secretary said—that it was proposed that the results of Father Lafont's daily observations should be published, by means of photozincography, in the Society's Journal or Proceedings in a style similar to those published by the Italian Spectroscopic Society of which specimens were on the table, and would add greatly to the interest and value of the Journal.

The President reported that Dr. T. R. Lewis has agreed to take up the duties of General Secretary during the temporary absence of Captain J. Waterhouse, with the Eclipse Expedition.

The Secretary announced that information had been received that the Geographical Congress of Paris has been postponed to 1st August next.

The Secretary reported that the Council have recommended the following gentlemen to serve on the several Committees during the current year,

#### FINANCE.

Bábu Rájendralála Mitra.  
L. Schwendler Esq.  
Dr. S. B. Partridge.  
J. Geoghegan, Esq.  
Col. H. Hyde, R. E.  
Dr. T. Oldham.

#### LIBRARY.

The Honorable J. B. Phear.  
Bábu Rájendralála Mitra.  
Col. H. Hyde, R. E.  
G. Nevill, Esq.  
A. Pedler, Esq.  
Dr. Mahendralál Sircar.  
L. Schwendler, Esq.  
J. Geoghegan, Esq.  
W. S. Atkinson, Esq.  
Dr. S. B. Partridge.  
C. H. Tawney, Esq.  
Whitely Stokes, Esq.  
G. W. Barclay, Esq.  
W. G. Willson, Esq.  
Dr. D. D. Cunningham.  
W. S. Brough, Esq.  
Dr. W. Waagen.



## PHILOLOGY.

Bábu Rájendralála Mitra.  
C. H. Tawney, Esq.  
Major-General A. Cunningham.  
J. Beames, Esq.  
F. S. Growse, Esq.  
Rev. K. M. Bannerjea.  
Bábu Gaurdása Basák.  
Dr. Mahendralál Sircar.  
Moulavi Abdool Latiff Khan Bahadur.  
Moulavi Kubiruddin Ahmed Sahib.  
Babu Dvijendranátha Thakura.  
Whitely Stokes, Esq.  
Bábu Pránnath Pandit.

## NATURAL HISTORY.

Dr. J. Ewart.  
W. S. Atkinson, Esq.  
L. Schwendler, Esq.  
G. Nevill, Esq.  
H. F. Blanford, Esq.  
V. Ball, Esq.  
H. B. Medlicott, Esq.  
D. Waldie, Esq.  
A. O. Hume, Esq.  
Dr. W. Waagen.  
Dr. J. Armstrong.  
S. Kurz, Esq.  
Dr. G. King.  
S. E. Peal, Esq.  
W. E. Brooks, Esq., C. E.  
Dr. S. B. Partridge.  
Dr. W. Schlich.  
W. Theobald, Esq.  
R. Lydekker, Esq.

## PHYSICAL SCIENCE.

His Excellency Lord Napier of Magdala.  
Col. H. L. Thuillier, C. S. I.  
H. B. Medlicott, Esq.  
H. F. Blanford, Esq.  
D. Waldie, Esq.  
L. Schwendler, Esq.



A Pedler, Esq.  
 R. S. Brough, Esq.  
 D. D. Cunningham, Esq., M. B.  
 The Hon'ble J. B. Phear.  
 A. Tween, Esq.  
 W. Theobald, Esq.  
 W. G. Willson, Esq., B. A.  
 A. Cappel, Esq.  
 Dr. S. B. Partridge.  
 Col. H. Hyde, R. E.  
 Dr. T. Oldham.  
 V. Ball, Esq.  
 Col. D. G. Robinson.  
 Rev. F. Lafont.  
 J. O'Kinealy, Esq.

## COINS.

Col. H. Hyde, R. E.  
 Bábu Rájendralála Mitra.  
 Major-General A. Cunningham.  
 Col. F. W. Stubbs.  
 Rev. M. A. Sherring.

## COMMITTEE OF PAPERS.

The Members of Council.

The following letter was read :

From Captain R. Beavan, Assistant Superintendent of Survey, Bann District, Panjab, enclosing a drawing of a stone with an inscription on it found by him last year in the Chanda district, Central Provinces.

DEAR SIR,—I have the pleasure to enclose a drawing of a stone with an inscription on it, which I found last year in the Chanda district, Central Provinces. I do not know whether it is of any interest, or what the language of the inscription may be, but I have no doubt you will have no difficulty in getting it deciphered. I shall be happy to give any further information regarding it should it turn out to be of any interest.

The President said—Captain Beavan's inscription is interesting as giving a very old character of the first century B. C., but it is imperfect, containing only the last letter of a long record. I read the letters **ड वा अ थ हा थ न** but cannot make out the meaning. The second is in modern character and may be read **सगपद्मजोगी**. The hermit (yogi) son of Magapanna 700. The pious man giving the name of his father instead of his own, he having become a hermit not wishing to parade his own good deed in dedicating the temple, by publishing his name. The figures indicate the date.

The following papers were read :



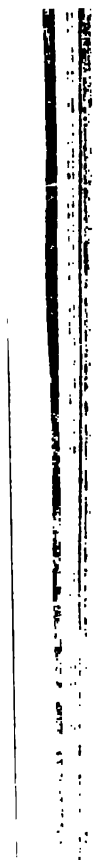


Zincographed at the Surveyor General's Office, Calcutta.

STONE NEAR TOORSA VILLAGE, AHERI ZEMINDARI, DISTRICT OF BHOJPUR.









2. *Note on the Alti Hills, Cuttack.*—By J. BEAMES, Esq., C. S.

Babu Rajendralala Mitra then read the following report on the Researches carried on by him for collecting information regarding Sanskrit MSS. in native Libraries.

*From Bábú R'AJENDRALA'LA MITRA,*

*To Captain J. WATERHOUSE, B. S. C.,*

*Secretary to the Asiatic Society of Bengal.*

*Dated Maniktollah, Calcutta, 15th February, 1875.*

SIR,—I have the honor to submit the following report on the operations carried on by me to the close of 1874 for collecting information regarding Sanskrit manuscripts in native libraries.

*Objects of the enquiry.*—2. Under the orders of Government my attention has been steadily directed—1st, to enquire and collect information regarding rare and valuable manuscripts; 2nd, to compile lists thereof; 3rd, to print all procurable unprinted lists of such codices with brief notices of their contents; 4th, to purchase, or secure copies of, such of them as are rare or otherwise desirable.

*Enquiry for MSS. Places visited.*—3. The work under the first head has been mainly conducted by a Pandit who has been deputed to the Mufassil to visit the different private Toles, or Sanskrit colleges, and private gentlemen who are reputed to possess collections of Sanskrit MSS., and I have been out on several occasions to help him. I have also been to Benares on three occasions to enquire for and purchase MSS. The places visited by the Pandit include the districts of Dacca, Nuddia, Burdwan, Hoogly, and 24-Purgunnahs. The large collections of Rájá Jotindramohan Tagore, of the late Sir Rájá Rádhákánta Deb, of the late Bábú Rámcomal Sen, of the late Rájá Pitámbar Mitra, of Bábú Subaldása Mallik, and of others in Calcutta have also been examined. In Dacca Pandits are the only owners of MSS., no private gentleman having anything like a large collection, and the few works they have, being mostly such as have already been printed. In Nuddia the library of the Rájá of Krishnanagar contains the largest number of Tantras, but at the time when my Pandit visited it, the MSS. were kept in a very neglected state, and most of them were found to be defective. In Burdwan there are not many Toles, but Bábú Hitalála Misra of Mánakara has a very choice collection of works, including a great number of very rare treatises on the Vedánta. In Hoogly, the Serampore College has a small but valuable collection of MSS. procured principally by the late Dr. Carey, and there are also a few Toles owning MSS. In the 24-Purgunnahs, several zemindars have good collections of the Tantras and the Púranas, and the numerous Toles on the left bank of the river Hoogly and at Harinábhi and elsewhere contain many old and rare works of which very little is known to European Orientalists. There are no *Maths* (monasteries)



teries) in any of the districts named which contain a collection of Sanskrit works : not even the Maṭh attached to the great temple of Tárakes'vara in the Hoogly district is noted for its literary treasures. The case is, however, different in Rájsháhi, Mymensing, Pabnah, Tirhoot, and Orissa, where some of the Maṭhs own large collections of great age and considerable value.

*Substance of MSS. Paper.*—4. The manuscripts examined have mostly been written on country paper sized with yellow arsenic and an emulsion of tamarind seeds, and then polished by rubbing with a conch-shell. A few are on white Kás'miri paper, and some on palm-leaf. White arsenic is rarely used for the size, but I have seen a few codices sized with it, the mucilage employed in such cases being acacia gum. The surface of ordinary country paper being rough, a thick coating of size is necessary for easy writing; and the tamarind-seed emulsion affords this admirably. The paper used for ordinary writing is sized with rice gruel; but such paper attracts damp and vermin of all kinds, and that great pest of literature, "the silver-fish," thrives luxuriantly on it. The object of the arsenic is to keep off this insect, and it serves the purpose most effectually. No insect or worm of any kind will attack arsenicised paper, and so far the MSS. are perfectly secure against its ravages. The superior appearance and cheapness of European paper has of late induced many persons to use it instead of the country arsenicised paper in writing puthis; but this is a great mistake, as the latter is not near so durable as the former, and is liable to be rapidly destroyed by insects. I cannot better illustrate this than by referring to some of the MSS. in the Library of the Asiatic Society. There are among them several volumes written on foolscap paper, which dates from 1820 to 1830, and they already look decayed, mouldering, and touched in several places by silver-fish. Others on John-letter paper, which is thicker, larger and stouter are already so far injured that the ink has quite faded, and become in many places illegible; whereas the MSS. which were originally copied on arsenicated paper for the College of Fort William in the first decade of this century are now quite as fresh as they were when first written. I have seen many MSS. in private collections which are much older, and still quite as fresh. This fact would suggest the propriety of Government records in Mofussil Courts being written on arsenicised paper instead of the ordinary English foolscap, which is so rapidly destroyed both by the climate and also by white-ants. To guard against mistakes, I should add here that the ordinary yellow paper sold in the bazars is dyed with turmeric, and not at all proof against the attack of insects.

*History of paper.*—5. It is well known that originally the Hindus used leaves of trees for writing upon, whence the name of letters in Sanskrit has become *patra*, and latterly newspapers have been designated by the same name. The oldest manuscript on paper I have seen is a copy of the



Bhágavata Purāṇa now in the possession of Bábu Harischandra of Benares. It bears date, Samvat, 1367=A. C. 1310, and is consequently 565 years old. Its paper is of a very good quality, and judging from it, it is to be inferred that the people of the country must have, at the time when it was written, attained considerable proficiency in paper-making. Long before that time, in the reign of Bhoja Rájá of Dhárá, a work was written on letter-writing (the *Prasasti-prakás'iká*, and in it detailed directions are given for folding the material of letters, for leaving a large space on the left side of such letters as margin, for cutting a portion of the left lower corner, for decorating the front with gold leaf, for writing the word *S'ri* a number of times on the back &c., &c., all which apply to paper, and cannot possibly be practicable on palm-leaf, and the inference therefore becomes inevitable that paper was then well-known and in general use, though the word used to indicate it was *patra*, probably very much in the same way as paper of the present day owes its name to papyrus. Again a verse occurs in the *Saṁhitá* of Vyása, which must be at least two thousand years old, in which it is said "that the first draft of a document should be written on a wooden tablet, or on the ground, and after correction of what is redundant and supplying what is defective, it should be engrossed on *patra*," and it would be absurd to suppose that *patra* here means leaf, for leaves were so cheap that it would have been a folly to save them by writing on wooden tablets which were much more costly. How long before the time of this verse paper was known, I have no positive evidence to show, but the frequent mention in the old Smritis of legal documents (*lekhyá*), of their attestation by witnesses, of their validity, &c., suggests the idea of there having been extant, in olden times, some material more substantial and convenient than palm-leaf for writing, and knowing that paper was first manufactured by the Chinese long before the commencement of the Christian era, that the famous charta bombycina of Europe was imported from the East, and that block-printing was extensively practised in Tibet in the fourth century, I am disposed to believe that the Hindus must have known the art of paper-making from a very early date. Whether they originated it, or got it from the Chinese through the Tibetans, or the Kás'miris, who have been noted for their proficiency in the art of making paper and papier-maché ware, is a question which must await further research for solution. *A priori* it may be argued that those who manipulated cotton so successfully as to convert it into the finest fabric known to man, would find no difficulty in manufacturing paper out of it.

*Palm-leaf.*—6. The palm-leaf referred to above is not now much in use, except in Orissa and in the Mufassil vernacular schools as a substitute for slates. In Bengal the Chandí is the only work which is now-a-days written on palm-leaf, as there is a prejudice against formal reading of that



work from paper MSS.—a preparation in many respects similar to what obtained in Europe against printed Bibles in the first century after the introduction of printing. Formerly two kinds of palm-leaf were in use, one formed of the thick strong-fibred leaflets of the *Corypha taliera* (tīret), and the other of the *Borassus flabelliformis* (tālpitā). The former is generally preferred for writing Sanskrit works, as it is broader and more durable than the latter, and many MSS. are still extant which reckon their ages by five to six hundred years. The leaflets of the *Corypha elata* is sometimes used in lieu of those of the *taliera*. The leaflets of all the three kinds of palms are first dried; then boiled or kept steeped in water for some time; then dried again; cut into the required size; and polished with a smooth stone, or a conch-shell. For school use no such preparation is necessary.

*Bark.*—7. The practice of writing on bark is of the greatest antiquity, and from constant use the Greek and the Latin terms for that substance—*biblos* and *liber*—have long since become the names for books, even as the name of the rolls of ancient parchment MSS. produced the term *volume*, and codes of laws have received their generic name from the bundles of boards on which they were written,—from *codex* a tablet of wood. In the eastern districts this practice of writing on bark still prevails, and I have seen several codices of bark, which formed thin sheets like veneer, eighteen inches by four; but I have not been able to ascertain from what species of tree the article had been obtained. Some say that the tree called *agra* (*Morunga hyperanthera*) yields the best bark for writing upon, but I have not seen it. The birch bark, Bhurjapatra (*Betula bhurja*) is extensively used as a material for writing upon, but only for amulets, it being too thin and fragile for books. I have by me a piece of this bark about a hundred years old, which on a space of ten inches by eight, contains the whole of the Bhagvadgītā, written with letters so small that they are illegible to the naked eye and require a magnifying glass to be read. It was evidently intended to be worn as an amulet enclosed in a locket of gold or copper, but it had never been so used. Whether the bhurj bark was ever pasted or glued into thick sheets I cannot say.

*Wood, metal and skin.*—8. In the S'āstras tablets of wood and metal have been recommended as materials for writing upon, and in former times, copper-plates were usually employed for royal patents, and in Burmah they are still occasionally used for writing large works; but I have seen none now used by the Pandits of Bengal. Wooden tablets are confined to petty traders' account-books in Bengal, but in the North Western Provinces poor people have some religious books written with chalk on blackened boards. In the Lalita Vistara, or legendary life of Buddha, mention is made of Sandal-wood boards which were handed to S'ākya when he first commenced to write. In Europe, parchment and dressed skins of goats have been from



time immemorial used as materials for books, and for durability they stand unrivalled; but I have never seen mention in Indian works of parchment or dressed skin of any kind as material for writing; and palimpsests are of course unknown.

*Pens.*—9. According to the Yogini Tantra, bamboo twigs and bronze styles are unfortunate, and gold and reeds are the best for pens; but the universal practice among the Pandits of Bengal is to use the bamboo twig for pens, and only rich householders employ the *crinnala* or *khákrá* reed. In the North Western Provinces, the reed or calamus, whence the Indian word *kalama*, is generally used, and bamboo pens are all but unknown. The latter, however, when well-prepared is much more elastic and durable, and it has the further and supreme advantage of being every where procurable without any cost. Crow-quills were formerly used for writing very small characters for amulets, but never for ordinary manuscripts. In Orissa, where letters are scratched and not written on palm-leaves, an iron style with a pointed end and a flat top every where replaces the bamboo twig and the calamus reed.

*Ordinary ink.*—10. The ink used for writing puthis is of two kinds; one fit for paper and the other for palm-leaves. The former is made by mixing a coffee-coloured infusion of roasted rice with lampblack, and then adding to it a little sugar, and sometimes the juice of a plant called *kesurte* (*Verbesina scandens*). The labour of making this ink is great, for it requires several days' continued trituration in a mortar before the lampblack can be thoroughly mixed with the rice infusion, and want of sufficient trituration causes the lampblack to settle down in a paste, leaving the infusion on top unfit for writing with. Occasionally acacia gum is added to give a gloss to the ink, but this practice is not common, sugar being held sufficient for the purpose. Of late an infusion of the emblick myrobolan prepared in an iron pot has occasionally been added to the ink, but the tannate and gallate of iron formed in the course of preparing this infusion are injurious to the texture of paper, and Persian MSS., sometimes written with such ink, suffer much from the chemical action of the metallic salts.

The ink for palm-leaf consists of the juice of the *kesurte* mixed with a decoction of *áltá*. It is highly esteemed, as it sinks into the substance of the leaf, and cannot be washed off. Both the inks are very lasting, and, being perfectly free from mineral substances and strong acids, do not in any way injure the substance of the paper or leaf on which it is applied. They never fade, and retain their gloss for centuries.

*Coloured ink.*—11. To mark the ends of chapters and for writing rubrics, colophons and important words on paper, an ink made of cinnabar, or *áltá*, is sometimes used, and in correcting errors the usual practice is to apply on the wrong letters a colour made of yellow or red orpiment ground



in gum-water, and when it is dry to write over it. Omissions of entire words and sentences of course cannot be rectified in this way, and they have therefore to be supplied by writing on the margin. Interlineation is generally avoided; but in old MSS. which have been read and revised by several generations, they are not altogether wanting. In commentaries, the quotations from texts are generally smeared over with a little red ochre, which produce the same effect which red letters in European MSS. were intended to subserve, and whence the term rubric got into currency. These peculiarities, however, are more prominent in the MSS. of the North Western Provinces than in those of Bengal, and in palm-leaf codices they are generally wanting, except in Burmah where some sacred Páli works are written with a thick black varnish on palm-leaves throughout richly gilt and wrought over with scrolls and other ornaments. Ordinary Burmese MSS. have the edges of the leaves painted and sometimes gilt.

*Illustrations.*—12. Illustrations are almost unknown in Bengal; but in Orissa they are frequently employed. The most noted place, however, for illustrations is Kás'mir, and the finest and richest MSS. are usually produced in that province, the illuminations consisting of flowery initials, grotesque cyphers, single figures, historical compositions, marginal lines, and scroll borders; most of the illustrations are in the Moorish style.

*Size &c. of Paper MSS.*—13. The size of paper MSS. varies from eight to twenty inches, by four to eight inches. The paper is folded so as to mark the margins and regulate the straightness of the lines. In the North Western Provinces, the paper is sometimes so folded as to retain two leaves together, but in Bengal it is always cut into separate and distinct folia. Sometimes a board mounted with strong thread tied at equal distances is used for a ruler. The paper is laid flat on this board, and then pressed hard with a ball of cloth whereby it receives an impression of the threads on its surface, and these impressions look very like water-lines. The leaves are written over lengthwise, leaving a uniform margin all round. The words are generally, but not always, separated by small spaces, and for punctuation the upright stroke or *dándi* is freely used. No breaks are made to indicate the ends of paragraphs or sections, and should the writing at the end of a work terminate in the middle of a line, the line is filled up by writing the letter *sri*, or stars, or the name of some god several times until the line is completed, so that all the lines may be of uniform length. In the case of codices which contain both a text and a commentary, the text is written in large letters on the middle, and the commentary above and below it in smaller letters. This arrangement is called the *trivalli* form, and some tact is necessary in engrossing such writing, so that all the commentary on the given text may be comprised on the same page. The copyist's name is frequently given at the end, and also the date in S'aka or Samvat, rarely in



Jupiter's cycles. The name of the place where the copy is made and that of the party for whom it is made are also occasionally given, but never the name of the reigning sovereign. A protestation sometimes occurs at the end, saying that the copyist has faithfully followed his text and is not responsible for errors.

*Size &c. of palm-leaf MSS.—14.* Palm-leaf MSS. are from the nature of the material narrower and longer, and they are never ruled or folded, the veins of the leaf serving the purpose of ruling. A square space is usually left blank in the middle of the page, and in the centre of it a round hole is punched for a string to pass through, for the purpose of tying the codex in a bundle. Very long MSS. have two such spaces and holes. The Tantras enjoin that the holes should always be punched, never cut with a knife, or produced by burning. The reason for this rule is obvious, as cutting or burning produces a hole with jagged sides which are very apt to catch the string and cause a split in the leaf. A clean-punched hole allows the string to slide freely, and produces no injury. In Bengal some very old paper codices have the square blank space in the middle, but none has any hole bored in it. In the North Western Provinces the blank space does not occur, and both in Bengal and the North West the leaves are piled in a bundle between two boards, and then tied round in a piece of coarse cloth. Where the codices are small, with a view to economy, several of them are usually tied in one bundle, and this causes much trouble in finding out any particular work when needed. For boards the spatha of the betel-nut tree, which yields a thick, coreaceous, pliant substance, is often substituted in the eastern districts, and they are found to be very useful, as they are not liable to warp, crack, or be attacked by insects.

*Mode of preserving MSS.—15.* In the houses of rich men a dry masonry room is generally assigned to MSS. where a sufficient number of shelves or chests are provided for the storage of the codices. But care is not always taken to open the bundles every now and then, and to expose them to the sun for a few hours. In pukká monasteries, the same mode of preservation is also adopted, and there being always some monk or other who can read, and who takes a delight in reading, the bundles are more frequently opened, aired and dried. The Jains are very particular in this respect, and in their monasteries great care is usually taken of their literary treasures. The case is, however, very different as regards the Toles of Bengal. The men who own them are, with rare exceptions, very poor; they live in low, damp, thatched huts of the meanest description; they have no means of buying proper cabinets for their manuscripts; and their time is so occupied by their professorial duties, and frequent perigrinations to distant places for earning the means of their livelihood, that they cannot often look after their books. The receptacle they usually



assign to their MSS. is a bamboo frame placed across the beams of their huts, exposed constantly to the damp emanating from the daily-washed mud floors of their rooms, and occasionally to leakage from ill-made and old thatched roofs, while mice and other vermin have full and free access to them at all times. The mice are particularly destructive, as they not only gnaw cloth, boards and palm-leaves, but by their liquid discharges, rapidly destroy the texture of arsenicised paper. The fact was first brought to my notice by a mukhtear when I was a boy. He asked my permission to put two sheets of fresh-looking, written, stamped paper for a night on the bottom of a cage of white mice which were my pets. The permission was granted, and the next morning the papers were taken out, stained and decayed very like old documents, which they were, I then learnt, intended to pass for. I was also told and shown that by careful and repeated washing with a mixture of the fluid discharge of mice with water, paper can be made to assume the appearance of any age that may be desired : the effect produced is not confined to the surface, but is perceptible even in the texture of the paper.

*Copyists and Copying.*—16. Even as in mediæval Europe monks were the principal copyists of ancient works, so were their congeners, the principal preservers of Sanskrit literature in India during the last ten or fifteen hundred years. Yatis, Sannyásis, Gossains, and their disciples congregated in large Maths, devoted all their leisure hours, the former in composing and the latter in copying, and the monasteries benefited largely by their labours. In the Toles the pupils were, and still are, the principal copyists. In return for the board, lodging and education they receive, free of all charge, from their tutors, they copy all such works as their tutors require, and thus the Toles are enriched. For the public, however, the principal copyists are the Káyasthas. Old and used-up men of this caste, when no longer fit to earn their livelihood by active exertion, generally betake to copying ancient works for householders and private gentlemen, and the bulk of the MSS. now extant is due to their labours. Poor Bráhmans also betake to this occupation. Seated on their haunches, with the paper, or palm-leaf, resting on their raised knees, which serve for a table, and the pen and ink procured from materials everywhere available, they ply their vocation without making any outlay, or subjecting themselves to any exertion which would be unsuited to their habits and time of life. The remuneration they formerly derived ranged from one rupee to two rupees eight annas per thousand śloka of thirty-two thousand letters, according to the quality of writing. The rates have now been doubled, owing principally to the demand for copyists being limited, and very few betaking to the profession. As a class, these copyists are men of limited literary knowledge ; but generally speaking, they are faithful to their duty, and reproduce the originals placed before them with fair accuracy.



*Authenticity of MSS.*—17. They rarely attempt to correct the errors and mistakes of the originals, and to exonerate themselves from all charge of tampering the originals, they not unoften put a verse at the end of their works, saying, “As he has seen, so has he copied, and the copyist should not be blamed for mistakes.” Clerical errors they are certainly liable to, and do commit, but such errors are not numerous. One serious mistake they, however, sometimes commit,—it is that of copying in the body of the text, notes and parallel or remarkable passages which often occur on the margins of old and frequently-read codices, and these consequently appear as parts of the texts in their works, and subsequent copying from their codices perpetuates the interpolation. This is, however, done through ignorance, and not through any wicked motive. Of fabrications and forgeries, the Máhátmyas and local legends afford ready instances ; but they are due to Pandits, and not to copyists. Corrections made by Pandits when reading are necessarily perpetuated by copyists, and to them is principally due the numerous *varæ lectiones* which are to be met with in Sanskrit writings. This evil has been of late greatly multiplied by incompetent editors, who print texts from solitary MSS., and replace doubtful readings and fill up lacunæ by imaginary emendations. With a few praiseworthy exceptions, the publications of the Bengali and Benares presses belong to this class, and they are much less trustworthy than even corrupt MSS. The plasticity of the Sanskrit language admits of even obviously incorrect readings being explained somehow, and the authenticity of the originals is thereby irretrievably ruined. The errors of MSS. may be corrected by collation, for though there are many faulty MSS. I have every reason to doubt that there are many falsified texts, but the fabrications in printed books issued by thousands cannot be readily detected and exposed.

With so many causes at work to injure the authenticity of ancient Sanskrit works, and at a time when European Orientalists are so busily employed in tracing interpolations and corruptions which have already taken place, it would be futile to attempt in a report like this, an enquiry at length how far the charge may be sustained ; but this much may be said that the MSS. now extant do not show any sign of dishonest fabrications ; codices from three to four hundred years old, existing in different parts of India, in Bengal, Madras, Bombay and Kás'mir, are so closely similar in their readings, that they produce no suspicion in the mind of their having been tampered with. What happened before that time, it is not necessary for me to guess ; suffice it to say, in the language of Isaac Taylor, that “the habitudes of Eastern nations undergo so little change in the lapse of ages that, probably, these descriptions of things as they are now, would differ little from a similarly graphic account of the same operations, dated a thousand years back. Where the arts of life remain in their rude state, all those operations which depend upon them, continue nearly the same.”



*Age of MSS.*—18. The oldest palm-leaf manuscript I have seen bears date Samvat 1189 = A. C. 1132, and the oldest paper manuscript as aforesaid is Samvat 1367 = A. C. 1310 ; but such records are exceedingly rare, and the general run is from 150 to 250 years. Among old MSS. taken to Europe, Dr. Weber, in his invaluable catalogue of the Berlin collection, notices several codices ranging from 4 to 6 hundred years. Seeing that charta bombycina has lasted in Europe for eight to twelve hundred years, this age for works which claim to be from two thousand to three thousand five hundred years old, is very unsatisfactory ; but the climate of Bengal and the manner of keeping MSS. here, as above described, are highly unfavourable to their preservation for a long time, not to advert to the wholesale destruction of MSS. in large Maṭhs, and richly endowed temples which must have resulted from the ravages of those whose co-religionists burnt the Alexandrine library. Indeed it is not remarkable that old MSS. are so rare, but that notwithstanding such potent influences constantly at work, there should still exist in the country so many and such old MSS. as have been from time to time met with. A new influence is now at work for the destruction of MSS. The halo of sanctity which formerly surrounded Sanskrit literature is fast fading away ; the ancient Hindu religion is gradually losing its hold on men's minds ; Sanskrit is no longer a paying study ; European literature is rapidly replacing it everywhere ; the venerable old pandits—the repositories of traditional and book knowledge of ages,—whose erudition was the profoundest, to whom no modern scholar, European or Asiatic, can for a moment be compared, and who have hitherto preserved with such unflinching zeal the oldest literary monuments of the Aryan race, are rapidly dying out, and their places are not being supplied by the rising generation. For hundreds who formerly studied Sanskrit we have not scores ; and, there being little demand, very few new MSS. are being prepared to take the place of those which are crumbling down by age. Many works of great literary value and age have already disappeared, and others are in eminent risk, and, unless timely saved, will in half a century more be irreparably lost.

*Accessibility of MSS.*—19. Generally speaking, the heads of Toles are the only persons who have really old and scarce works. They know the value and history of the several works on particular branches of Sanskrit learning to which they severally devote their attention, and each tries his utmost to secure copies of all the leading and rare works bearing upon the subject of his study. It also often happens that the son generally takes up the subject in which his father was most proficient, and in some families for many successive generations the same subject has been studied, and the works collected by them are generally very correct and complete. But the worthy professors, deeply learned as they are, are not open to



worldly influence, and extremely shy and suspicious. In their estimation, the most valued treasures they possess are their MSS., and they evince the greatest reluctance to show them to strangers. Ordinarily they do not flatly refuse access to their stores, though some do so ; but the passive resistance they offer is often insurmountable. The first day's visit is generally passed in conversation ; on the second day a few of the commonest works are shown ; on the third, the proprietor is busy with other duties and has no time to bring out MSS. ; on the fourth day, he is not at home and so on several days are lost, before a really good MSS. is brought to light, and as my plan requires the copying of the initial and final lines, and an abstract of the contents, a great deal of valuable time is lost before a single collection is finally examined, and before this consummation can take place, it often happens that the owner of the MSS. is called away by a distant invitation or some other errand, and my travelling pandit's work is brought to a stop. No possessor of a Tole has any catalogue or list of his MSS. and if by dint of repeating the names of a great number of rare works, the owner is made to acknowledge he has a particular work, very little advance is made towards getting access to it, for the bundles in which MSS. are kept are not numbered, and as from 6 to 20 different works find place in each bundle, the task of finding it out takes days, if it be at all forthcoming, which is not always the case.

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*Age of MSS.*—18. The oldest palm-leaf manuscript I have seen bears date Samvat 1189 = A. C. 1132, and the oldest paper manuscript as aforesaid is Samvat 1367 = A. C. 1310 ; but such records are exceedingly rare, and the general run is from 150 to 250 years. Among old MSS. taken to Europe, Dr. Weber, in his invaluable catalogue of the Berlin collection, notices several codices ranging from 4 to 6 hundred years. Seeing that charta bombycina has lasted in Europe for eight to twelve hundred years, this age for works which claim to be from two thousand to three thousand five hundred years old, is very unsatisfactory ; but the climate of Bengal and the manner of keeping MSS. here, as above described, are highly unfavourable to their preservation for a long time, not to advert to the wholesale destruction of MSS. in large Maths, and richly endowed temples which must have resulted from the ravages of those whose co-religionists burnt the Alexandrine library. Indeed it is not remarkable that old MSS. are so rare, but that notwithstanding such potent influences constantly at work, there should still exist in the country so many and such old MSS. as have been from time to time met with. A new influence is now at work for the destruction of MSS. The halo of sanctity which formerly surrounded Sanskrit literature is fast fading away ; the ancient Hindu religion is gradually losing its hold on men's minds ; Sanskrit is no longer a paying study ; European literature is rapidly replacing it everywhere ; the venerable old pandits—the repositories of traditional and book knowledge of ages,—whose erudition was the profoundest, to whom no modern scholar, European or Asiatic, can for a moment be compared, and who have hitherto preserved with such unflinching zeal the oldest literary monuments of the Aryan race, are rapidly dying out, and their places are not being supplied by the rising generation. For hundreds who formerly studied Sanskrit we have not scores ; and, there being little demand, very few new MSS. are being prepared to take the place of those which are crumbling down by age. Many works of great literary value and age have already disappeared, and others are in eminent risk, and, unless timely saved, will in half a century more be irreparably lost.

*Accessibility of MSS.*—19. Generally speaking, the heads of Toles are the only persons who have really old and scarce works. They know the value and history of the several works on particular branches of Sanskrit learning to which they severally devote their attention, and each tries his utmost to secure copies of all the leading and rare works bearing upon the subject of his study. It also often happens that the son generally takes up the subject in which his father was most proficient, and in some families for many successive generations the same subject has been studied, and the works collected by them are generally very correct and complete. But the worthy professors, deeply learned as they are, are not open to



worldly influence, and extremely shy and suspicious. In their estimation, the most valued treasures they possess are their MSS., and they evince the greatest reluctance to show them to strangers. Ordinarily they do not flatly refuse access to their stores, though some do so ; but the passive resistance they offer is often insurmountable. The first day's visit is generally passed in conversation ; on the second day a few of the commonest works are shown ; on the third, the proprietor is busy with other duties and has no time to bring out MSS. ; on the fourth day, he is not at home and so on several days are lost, before a really good MSS. is brought to light, and as my plan requires the copying of the initial and final lines, and an abstract of the contents, a great deal of valuable time is lost before a single collection is finally examined, and before this consummation can take place, it often happens that the owner of the MSS. is called away by a distant invitation or some other errand, and my travelling pandit's work is brought to a stop. No possessor of a Tole has any catalogue or list of his MSS. and if by dint of repeating the names of a great number of rare works, the owner is made to acknowledge he has a particular work, very little advance is made towards getting access to it, for the bundles in which MSS. are kept are not numbered, and as from 6 to 20 different works find place in each bundle, the task of finding it out takes days, if it be at all forthcoming, which is not always the case.

In the houses of private gentlemen access is readily given ; but when visits have to be repeated for days, the party in charge of the library offers much passive resistance, and a great deal of time is lost to meet his convenience.

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made from this record of all works which require to be noticed in detail, and the descriptive accounts are then written out in full.

*Publication of Notices.*—22. At first I was under an impression that separate lists of particular collections would be the best, as suggested in the orders of Government; but I soon perceived that it involved much unnecessary trouble and expense, and caused the repetition of the same names a great number of times. So it had to be given up. The nominal list referred to in the last preceding para. will, I think, when completed and published, supply the information fully and in a handy form.

In the meantime my attention has been devoted to detailed notices of all works not included in the catalogue of the Asiatic Society's collection. Of these "Notices" two volumes and one part have already been published, comprising altogether 861 pages royal octavo, and descriptive accounts of 1140 separate codices. For the sake of carrying on the printing while my researches are in progress, no systematic arrangement is attempted, and manuscripts are noticed as they turn up. The inconvenience arising from this course is, however, obviated by annexing to each volume a classified table, and a full alphabetical Index.

*Contents of the Notices.*—23. The number of Vedic works or portions of the Vedas in the published Notices is limited, and all of them have been seen or obtained at Benares, not a single codex having been seen in the possession of a Pandit of Bengal in the several Toles which have been visited. This total absence of the most important and most revered of Sanskrit works in the libraries of those who have been the principal custodians of Sanskrit literature is a remarkable fact, and it is usually accounted for by the Pandits by reference to a verse of the *Yogini Tantra* which says, "whoever keeps MSS. of the Vedas in his home, soon finds his abode struck by lightning." The verse is obviously due to the sectarian zeal of the *Tantra* which would admit of no rival in its neighbourhood, but the true cause, I believe, is that Bengal has never been the seat of a Vedic school, and consequently it has never been taught here, nor MSS. prepared or preserved. It is said that when on the overthrow of the Pála rājās, A'disura, the Hindu sovereign of Bengal, wanted to celebrate a great Vedic sacrifice, he could find no native Bráhmaṇ competent to officiate at it, and had to indent for five learned priests from Kanauj. These priests settled in the country, and gave new life to Hinduism everywhere; and many of their descendants have been noted as great scholars and distinguished authors; but they do not seem to have cultivated the Vedas, and there is not a single treatise on the Vedas or Vedic learning among their writings. Their special forte has been philosophy, and works on the subject are abundant everywhere. The *Nyāya* schools of Tírhut and Nuddia have enjoyed deserved celebrity all over India, and every Pandit of any note has some work or other on the subject, not



common elsewhere. Works on the Vedánta are also numerous. The former class is represented in the published Notices by 98 treatises, and the latter by 67 codices. The Upanishads as bearing on the Vedánta are represented by 92 works. The Tantras come next to Nyáya ; Bengal is particularly noted for them, and of them I have noticed 205 works or parts of works. In my last report I have already given an account of the nature and character of this class of works. Grammar, Lexicography, Rhetoric and other branches of Sanskrit learning are also fairly represented in my Notices.

\* \* \* \* \*

It should be noted, that in making my selections I have been guided by a desire to exclude all works existing in the Library of the Asiatic Society of Bengal, a descriptive catalogue of which is in the press, and it is not desirable that the same works should be twice noticed. My work will, in conjunction with the catalogue of the Calcutta Sanskrit College and that of the Asiatic Society, constitute a complete record of the bulk of the Sanskrit literature extant in Bengal, and as all the three works are being printed at the cost of Government they may well be taken to be parts of one undertaking.

*Facsimiles.*—24. At the suggestion of Mr. Burnell of Mangalore, I have introduced in the last two fasciculi facsimiles of some of the more ancient and important MSS. noticed. When a sufficient number of these illustrations have been published, they will prove of much use in determining the age of manuscripts from the style of their writing, and as contributions to a knowledge of Indian Paliography.

*Oudh Catalogue.*—25. While carrying my Notices through the press, I have been also engaged in editing a Catalogue of Sanskrit MSS. existing in Oudh. Four fasciculi of this work have already been published.

*Purchase of MSS.*—26. MSS. are not marketable articles ; they do not readily find purchasers ; the people at large look upon them as worthless ; and consequently there are no shops in Bengal for the sale of MSS., while the Pandits of the province who are the principal owners of MSS., look upon them as treasures of inestimable value, never to be parted with on any account. I have, therefore, found the greatest difficulty in buying MSS. in Bengal. The case is different at Banares. From all parts of India, Pandits, at an advanced age, leaving everything behind them, except their MSS., repair to that sacred place to die, and on their demise, hawkers purchase their stocks for a trifle, and subsequently sell them to pilgrims and others at a considerable profit, and my purchases have been made principally from these hawkers. The total of my acquisitions on account of Government comprises 662 codices, mostly entire works, some being frag-



ments of larger treatises. Most of these have been purchased, a few being copied to my order.

\* \* \* \* \*

Most of these are new to the Asiatic Society's collection, and are generally old and correct. Several of them are very scarce. A good many relate to the rites and ceremonies of the Vedas. Though small and not of much worth as literary compositions, these last will be found of great value to scholars engaged in the study of the Vedas, as they help materially to illucidate all obscure passages relating to the Vedic ritual. A few are worthless having been taken only because they happened to be parts of collections which the owners would not break up. The names of the works are given in the Appendix. As they have been, or will be, fully described in my Notices, I refrain from giving a detailed account of them here.

*Rare MSS.*—27. Among the MSS. that I have seen or purchased there are, however, some which require special mention here. Following the order of the classification above given, the first work I have to notice is the *Aitareya A'ranyaka* of the Rig Veda. Good MSS. of this work are not accessible in Europe, and about eighteen months ago Professor Max Müller called my attention to it, and suggested the propriety of collecting materials for an edition of it for the *Bibliotheca Indica*. I have since found five old MSS. of it with the commentary of Sāyana, and a carefully collated text of this work has been prepared for the Press. At the time named, Professor Max Müller also directed my attention to the *Bṛihaddevatā* of Saunaka, of which also good MSS. are not available in Europe. I have seen six codices of this work, four of them very old and correct, and belonging to two different recensions. These have all been collated, and an eclectic copy prepared for the Press.

The next work I have to notice is the *Kalpa Sūtra* of A'pastamba. The only complete copy of this treatise I have heard of belongs to Mr. Burnell of Mangalore. During my recent tour in the North West, I found several fragments of it. These have all been purchased, and they make up a little over two-thirds of the work.—(22 out of 28 chapters.) I have also found a fragment of Dhūrta's commentary on it, and Kausikārāma's gloss on the exegesis of Dhūrta.

Among Vaidika works I should also mention some short treatises on Vedic Phonetics which I have met with. These include (1) the *Paṇinīya S'ikshā*; (2) the *Lomasī S'ikshā*; (3) the *Kātyāyana S'ikshā*; (4) the *Amoghānandini S'ikshā*; (5) *Kaus'iki S'ikshā*; (6) *Maṇḍuka S'ikshā*; (7) *Nāradiya S'ikshā*; (8) *Pārāsara S'ikshā*; (9) *Kes'avi S'ikshā*, and (10) the *S'ikshā-vivarāṇa*. Seven of these have not yet been noticed by European orientalists.



Under the general head of *Kāvya*, my acquisitions include a codex of the Bengali recension of the *Sakuntalā* three hundred and two years old: a fragment of the *Vrihatkathā* of Kshemendra, about four hundred years old; a Sanskrit version of the Hindi *Totākahāni* or *Tales by a Parrot*, and a complete copy of Narahari's commentary on the *Naishadha*.

But the most important of my acquisitions are treatises on the grammar of the Prakrit languages. These include 1st, *Audārya-Chintāmani* of Subhasāgara; 2nd, *Prākṛita-sarvasva* of Mārkaṇḍeya; 3rd *Prākṛita-kaumudī*; 4th *Prākṛitalankesvara*, of Vāvana; 5th *Prākṛita kāmādhenu* of the same *Prākṛita-lakshana* of Chāṇḍa; 7th *Prākṛita-chandrikā*; 8th *Prākṛita*-author; 6th *manoramā*. None of these has been noticed in Professor Lassen's *Institutiones Lingarū Prakriticarū*, and all of them will, I think, be new to European scholars. The first I believe is the same work which Dr. Hérnlé has noticed in the *Indian Antiquary* of August last, but it is there described to be the work of one Subhachandra. My codex comprises only two chapters. It has been copied from a text which, from the appearance of its paper and the antiquated form of its writing, I believe is about five hundred years old.

#### LIBRARY.

The following additions have been made to the Library since the meeting held in February last.

#### *Presentations.*

\*.\* Names of Donors in Capitals.

Bulletin de la Société de Géographie, Novre. et Décbre. 1874.

Novembre. C. *Ducos de la Haille*.—Le cours du Hong-Kiang, ou fleuve Rouge, au Tongkin, d'après les notes et renseignements de J. Dupius. L. *Kostenko*.—Khiva en 1873.

THE GEOGRAPHICAL SOCIETY OF PARIS.

Annales de la Société D' Agriculture de Lyon, 1871, 1872.

THE AGRICULTURAL SOCIETY OF LYON.

Mittheilungen der Deutschen Gesellschaft für Natur und völkerkunde Ostasiens, December 1874.

THE GERMAN ORIENTAL SOCIETY OF NATURAL HISTORY AND ETHNOLOGY OF EAST ASIA, YOKAHAMA.

Tijdschrift voor Indische Taal-land en Volkenkunde, Deel XVIII, 6th series, Afflg. 5-6, Deel XX, 6th series Deel III, Afflg. 6. 7th series Deel I, Afflg. 4-5, Deel XXI, Afflg. 1-2.

Notulen van de Algemeene en Bestuurs Vergaderingen, Deel X, Nos. 1-4, Deel XI, Nos. 1-4.

Verhandelingen. Deel XXXVI.

Codicum Arabicorum.

THE BATAVIAN SOCIETY OF SCIENCE



The Antiquities of Orissa, Vol. I, by Babu Rájendralála Mitra.

THE AUTHOR.

Notes on the lost river of the Indian Desert by Surgeon-Major C. F. Oldham.

THE AUTHOR.

Professional Papers on Indian Engineering, No. 15.

THE EDITOR.

The Christian Spectator, No. 45.

THE EDITOR.

Synopsis of the results of the operations of the Great Trigonometrical Survey of India, Vol. II, descriptions and Co-ordinates of the principal and Secondary stations and other fixed points of the Great Arc-Section 24° to 50° by Col. J. T. Walker, Vol. III, Descriptions &c. of the Karachi Longitudinal series.

THE GOVERNMENT OF INDIA.

Report on the Administration of the Panjab and its dependencies for 1873-74.

THE GOVERNMENT OF THE PANJAB.

Report on the Administration of the N. W. Provinces for 1873-74.

THE GOVERNMENT OF THE N. W. PROVINCES.

Report on Vaccination for 1873-74.

THE GOVERNMENT OF MADRAS.

Catalogue of Sanskrit MSS existing in Oudh edited by Rajendralála Mitra, Fasc. IV.

THE CHIEF COMMISSIONER OF OUDH.

The Cultivation and curing of Tobacco in Bengal. Report on the Land Revenue Administration of the Lower Provinces, 1873-74. Report of the Sanitary Commissioner for Bengal for 1873. Report on the Financial Results of the Excise Administration in the Lower Provinces, 1873-74. The Sukla-Yajur-Veda, Vájasaneyi Sanhitá Mádhyaandiniya Sákhá, Nos. 1-3. Report on the Administration of Bengal, 1873-74.

THE GOVERNMENT OF BENGAL.

Records of the Geological Survey of India, Vol. VIII, part 1.

Annual Report of the Geological Survey of India and of the Geological Museum for 1874. *Dr. F. Stoliczka*.—The Altum-Artush considered from a Geological point of view. *F. Fedden*.—On the evidences of Ground-Ice in Tropical India during the Talchir period. *T. W. Hughes and H. B. Medlicott*.—Trials of Raniganj Fire bricks.

THE SUPERINTENDENT OF THE GEOLOGICAL SURVEY OF INDIA.



*Exchange.*

The Geographical Magazine, January 1875.

*D. Ker.*—The mineral wealth of Central Asia as bearing on Russian Progress. *E. Schuyler.*—The journey of the Chinese traveller Chang-Te-Hui.

Nature, Nos. 270-273.

*Purchase.*

Wood's Journey to the source of the Oxus. Vassilief's Le Bouddhisme, ses Dogmes son Histoire et sa Littérature. Dr. Lefmann's Lalita vistara, part I. Pertsch's Grammatik Poetik und Rhetorik der Perser. Jagor's Reisen in den Philippinen. Thomas's Numismata Orientalia, part I. Mémoires du Museum d' Histoire Naturelle, Vols. 1-20. Hodge's Travels in India. Bate's Hindee Dictionary. Eitel's Buddhism. Cherbonneau's Droit Musulman, du Statut Personnel et des Successions, Tome II. Mehren's Manuel de la Cosmographie du Moyen age. Kern's The Aryabhattacharya with the Commentary Bhata Dipika of Paripadisvara. Guyard's Fragments relatifs a la Doctrine des Ismaélis.

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PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR APRIL, 1875.

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The monthly General Meeting of the Society was held on Wednesday, the 7th instant, at 9 o'clock P. M.

T. Oldham, L.L. D., Vice-President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table :—

From the author, a copy of a work entitled "A Manual of Telegraph Construction," by J. C. Douglas, Esq.

From the author, a copy of a work entitled "Hindu Musical Collections," by Bábu Sourindro Mohun Tagore.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members :—

Major Lord Ralph Kerr, Mathura.

Captain E. A. D. LaTouch, Sámagúting (Assam).

Dr. A. J. Wall, Bengal Medical Service.

The following are candidates for ballot at the next meeting :—

Dr. E. W. Chambers, proposed by Dr. J. Ewart, seconded by Dr. T. R. Lewis.

Dr. J. F. P. McConnell, Professor of Pathology, Medical College, Calcutta, proposed by Dr. T. R. Lewis, seconded by Mr. J. Wood-Mason.

E. C. Carrington, Esq., Chief Civil Assistant Marine Survey Department, proposed by Dr. T. Oldham, seconded by Dr. T. R. Lewis.

The following gentlemen have intimated their desire to withdraw from the Society :—

T. F. Harkness, Esq., Etah.

A. P. Howell, Esq., C. S., Calcutta.

J. Kimber, Esq., Calcutta.

J. Sime, Esq., Delhi.



The chairman announced that the Hon'ble E. C. Bayley had tendered his resignation as President of the Society, and that Dr. T. Oldham had been nominated by the Council as his successor, subject to the confirmation of the present meeting of the Society.

Confirmed.

Also that the Council had nominated Dr. T. R. Lewis to be a Trustee of the Indian Museum on the part of the Asiatic Society, during such time as the office of President shall be held by the Superintendent of the Geological Survey.

Confirmed.

The President reported on the part of the Council that they recommend a grant of a sum not exceeding Rs. 50 per mensem towards the expenses of the preliminary proceedings of the Earth-Current Committee in compiling, calculating and reporting on the Earth-Current Observations made by the Government Telegraph Department. Subject to reconsideration after the expiry of six months.

Confirmed.

Mr. L. Schwendler explained in what manner the system of measuring Earth-currents was to be carried out. The first question to be solved was to prove that the natural currents observed at all times in the telegraphic lines were really due to one and the same cause. For this purpose it was necessary to establish simultaneous observations all over India. After such a general cause had been proved to exist, it would then become necessary to establish a series of measurements at a few selected stations. The Earth-Current Committee would then, it is hoped, be in a position to show results of considerable importance.

The President brought to the notice of the meeting that some tickets of the International Congress of Orientalists held in Paris during the year 1873, have been received for disposal among the Society, the subscribers becoming entitled to the volumes of the Proceedings of the Congress for that year.

The following inscriptions were received from Bábu Harischandra of Banáras, through Bábu Rájendralála Mitra, who has furnished the translations.

No. 1. *From Manikarniká-kunḍa or Chakrapuskarini-tirtha at Banaras.*

- (1.) श्री। सोमनाथपट्टचन्द्र १६८० मिते शुभेष्टौ। मासे शुचौ ब्रह्मतिथौ
- (2.) शिवार्था॥ चकार नारायणदासमुनिः। सोपानमेतच्छिव-
- (3.) कर्षिकायाः॥ १॥ जातः क्षितौ वासवमुखातेजाः। सोमान्वये
- (4.) भूपतिवासुदेवः॥ तस्यामुवर्त्ती मणिकर्षिकाया। चकार सो-



- (5.) पान ततिनैरनुः ॥ १ ॥ वासुदेवायसचिवो नरेणु\* रावतात्मजः  
 (6.) चक्रगुष्करिणो तीर्थं श्रीशंभारनक्षीकरन् ॥ १ ॥ शुभम् शो\*

*Auspicious.* This flight of steps to Manikarniká was prepared by Náráyanadása Gupta for the service of S'ivá, in the fortunate year of sky, eight, six, and moon = 1680, in the month of *Suchi* (Jyeshtha), on the 2nd (brahma) day of the moon.

2. There was born on the earth a king named Vāsudeva, valiant as Indra, and of the lunar race. Narenu a dependant of his, made this flight of steps for Manikarniká.

3. Narenu, a minister of Vāsudeva and son of Rávata, caused the repairs of the Chakratirtha tank to be made. May it prove propitious!

Bábu Rájendralála Mitra said, the great antiquity of the tank being well-known, this inscription was of no use in illustrating its history. The date too being given without any mention of the era, it served no useful purpose in determining the date of the repairs. It was nevertheless of importance, as affording an instance of the use of the word *chakára* = "made" in the sense of "repaired." In the first two stanzas the word occurs twice, and in both places the clear and unquestionable meaning is, that the *ghat* was made by Narenu, but in the last verse this is explained to mean repairs (*jirnoddhára*) only. In several inscriptions particularly some of Buddha-gayá, much confusion had been caused by taking the word in its primary sense, and not as implying repairs. The use of technical terms along with the ordinary names of numerals was also remarkable.

*No. 2. From the Panchagangá ghat at Banáras. Inscribed on the Marhi of Shes'as'ái.*

श्री सम्बत् १६१७ समये सर्व्वे नानि सम्पत्तये असाह बदि १० डंडन वंश सम्भूत  
 माधवदासात्मज एवमाद्येन प्रतिष्ठित मिदं वंश गोपाळ

*Translation.*—Auspicious. This was consecrated by Raghunátha, son of Mádhava-dása of the Tandana-family on the 10th of the wane in the month of A'ahádha, Samvat 1637, in the year named. Sarva (of Jupiter's cycle)." Vansagopála.

Bábu Rájendralála Mitra observed that the *marhi* or domed temple is an insignificant one, but the Panchagangá being a place of great sanctity, is largely frequented. The image in it is of Vishnu sleeping under the expanded hood of a cobra.

*No. 3. From the Draupadi-kunda at S'ivapura, being the fourth stage in the Panchakuss'a Yátá, a village three miles from the city of Banáras.*

- (1.) श्री गणेशायनमः । — — — — —  
 (2.) — — — — —  
 (3.) ॥ १ ॥ प्रत्यर्चिषितिपासकासनमुद्धत् संसासनेकृतिका । मुद्रांक-

\* Panditas Sítalá Prasáda and Bichanaráma, of the Banáras Sanskrit College, have very much assisted me in reading this.



- (4.) प्रकटप्रतापतपनप्रोद्भासितामृते ॥ चोद्वेमेकवरे प्रभासति मर्षी  
 (5.) तस्मिन् वपाद्यावसौ । स्फूर्जन् मोक्षिमरीचिवीचिरचिरोद्भूतं पदाभोरहे ॥ १ ॥  
 (6.) तद्भाष्यैकधुरन्धरस्य वसुधासाक्षाद्वदोद्यागुरोः । श्रीमद्वन्दनवर्त्मनश्च-  
 (7.) मयेः श्रीदेवदरणापतेः ॥ धर्मायैकविधो समाहितमते राक्षसतोषीकरत् ।  
 (8.) वार्पि पाण्डव मण्डपे च . . नो गोविन्ददासः सुधीः ॥ १ ॥ कृतनिगम-  
 (9.) रसात्मा १६४६ सन्निवेद्यरेजे ।  
 सुकृतिस्तुतिरितैवो\* देवदरणापतेः ॥  
 (10.) विहित विविध पूजैः शोकरचारवार्पि । निमल सलिलतारां  
 (11.) वन्द्योपानपतिं ॥ ४ ॥ शुभम् संवत् १६४६ कारकृमाकेदासाह वै ॥

*Translation.*—When the earth was governed by the lord of the world Akbar, whose fame and glory in protecting those who subdued hostile potentates, were prominently stamped all over the quarters like the sun, and whose lotus-feet were resplendent with the waves of refulgent light proceeding from the crowns of kings: the intelligent Govindadāsa made this well at Pāndavamandapa,—by order of king Todara the glory of the Tanḍana race, whose mind was immersed in the laws of religion and wealth, who has the minister (*i.e.* the only weight-supporter) of Akbar's dominion, and chief adviser in matters of royal policy.

In the year of the seasons (8), the Vedas (4), the flavours (6), and the soul (1). *i. e.*, 1646, Todara, the protector of the earth, the doer of good deeds, the successful, the well-wisher of mankind, the author of many public works, made this handsome well, full of pure limpid water and provided with a flight of steps. May this prove propitious. Samvat 1646.

Kodara Shah was the architect.

Bābu Rājendralāla Mitrā stated that the end of the first line, the whole of the second line and the beginning of the third line of the inscription were illegible. They probably contained a benedictory stanza, and therefore were not of much consequence. The only matter of importance in the record was the name of the family of Todar Mall which had hitherto been doubtful. On the authority of the inscription this may now be accepted to have been Tanḍava. The name is the same as that which occurs in the second inscription. The last line is in Hindi.

Mr. Blochmann said that Persian historians had not mentioned the family name of Todar Mall, and that they gave Lāhor as his birthplace; but it had now been proved that Todar Mall was born at Lāharpur in Oudh, where he first served as a military officer.

Mr. Blochmann then laid before the meeting, some photographs received through the Hon'ble E. C. Bayley from General A. Cunningham, of the Bharāhat Sculptures and also photographs of two copper-plate grants of one of the Vallabha kings received from Dr. Buhler.



The following papers were read—

1. *Postscript to the List of Chiroptera inhabiting the Khasia Hills,—\**  
by G. E. DOBSON, B. A., M. B.

**BARBASTELLUS DARGELINENSIS.**

*Plecotus dargelinensis*, Hodgson, Ann. Mag. Nat. Hist. 1855, p. 103.

*Plecotus auritus*, Blyth, Cat. Mammal. Mus. As. Soc. Bengal, p. 86, No. 114.

This species, which, on a superficial examination appears not to differ from the European form, may be readily distinguished from that species by the absence of the small, but very distinct, lobe, which in *B. communis*, projects from the outer margin of the ear at a point corresponding to the junction of the upper and middle thirds, and by the conspicuously larger ears which, laid forward, extend beyond the extremity of the muzzle.

*Plecotus homochrous*, Hodgs., a species belonging to a genus closely allied to *Barbastellus* may also be expected to occur in the Khasia Ranges. It is distinguished from *P. auritus*, S. of Europe by its larger ears, by the proportionately much shorter thumb, and by the tail being wholly contained within the interfemoral membrane, not projecting for 0·15 inch., as in the European species.

2. *On a Coin of Kunánda (340 B. C.) found at Karnál.†*

By BABU RA'JENDRALA'LA MITRA'.

(Abstract.)

The mintage of which the coin submitted to the meeting was a specimen was well known to numismatists; but the specimen was a remarkably perfect one, and it enabled the author to express a decided opinion on the reading of two of the words in its legend. The first word was the name of the king, which Mr. Thomas, in his last essay on the subject in the 1st Volume of the Royal Asiatic Society's Journal (N. S.), had read *Krananda*. This has been questioned and the author has sided with Prinsep and Cunningham in accepting it as *Kunanda*. The second word has hitherto been read *amoghabhratasa*, but the letters on the coin are perfectly clear, and they yield the word *amoghabhatisa* which is obviously a compound of *amogha* "unflinching" and *bhakti* "faith," referring to the 'unflinching faith' of the sovereign who had evinced it by delineating half a dozen symbols of the Buddhist religion on his coin. The old interpretation was "brother of Amogha," but as no king could feel himself flattered by saying that he was the brother of so and so, that is suspected not to be the right one. The presence of an *i* over the *t* in *bhati* is also against that supposition, inasmuch as the Sanskrit *bhrátri* always changed into *bhrúta* or *bhátá* or into *bhrátara* never *bhāti* in the Aryan-Páli, and there is no reason to suppose that the reading of the coin is an exceptional one.

\* *Vide* Journal As. Soc. B. Part II, No. 4, 1874.

† Received from the Rev. Mr. Carleton of Karnál.



## LIBRARY.

The following additions have been made to the Library since the meeting held in March last.

*Presentations.*

\*.\* Names of Donors in Capitals.

Proceedings of the Royal Society, Vol. XXIII, Nos. 156 and 157.

No. 156. *G. Busk* :—Note to the "Report on the Exploration of Brixham Cave." *Rev. S. Haughton* :—On the Tides of the Arctic Seas. Part IV. The Tides of Northumberland Sound at the Northern Outlet of Wellington Channel. Part V. The Tides of Refuse Cave in Wellington Channel. *A. J. Ellis* :—On Musical Duodenes, or the Theory of Constructing Instruments with Fixed Tones in Just or practically Just Intonation.

No. 157. *G. F. Rodwell* :—On the Effects of Heat on Iodide of Silver. *R. C. Shettle* :—Experiments showing the Paramagnetic condition of Arterial Blood, as compared with the Diamagnetic condition of Venous Blood.

THE ROYAL SOCIETY OF LONDON.

Proceedings,—Institution of Mechanical Engineers, August, 1874. Cardiff Meeting, Part I.

*J. McConnochie* :—On the Bute Docks at Cardiff and the mechanical arrangements for shipping coal. *G. B. Rennie* :—On the Pumping Machinery for emptying the Dry Docks at Chatham and at Rio de Janeiro.

INSTITUTION OF MECHANICAL ENGINEERS OF BIRMINGHAM.

The Quarterly Journal of the Geological Society, Vol. XXX. Part 5. No. 120.

*Dr. F. Stoliczka* :—On the Occurrence of Jade in the Karakash Valley, on the Southern Borders of Turkestan. *Dr. F. Stoliczka* :—On the Route traversed by the Yarkund Embassy, from Shahidulla to Yarkund and Kashgar. *Dr. F. Stoliczka* :—On a Visit to the Chaderkul, Thian-Shan Range.

THE GEOLOGICAL SOCIETY OF LONDON.

Journal of the Statistical Society of London. Vol. XXXVII. Part IV. December, 1874.

*N. A. Humphreys* :—The Value of Death-Rates as a Test of Sanitary Condition. *Professor W. Stanley Jevons* :—The Mathematical Theory of Political Economy.

Statistical Society's Almanack for 1875.

STATISTICAL SOCIETY OF LONDON.

Journal Asiatique, Paris. Vol. IV. No. 7. October and November, 1874.

ASIATIC SOCIETY OF PARIS.

Journal of the Chemical Society of London. Vol. XII. Ser. 2. November and December, 1874, and Vol. XIII. Ser. 2. January 1875.

CHEMICAL SOCIETY OF LONDON.



Bulletins de la Société D'Anthropologie de Paris. April to June 1874.

ANTHROPOLOGICAL SOCIETY OF PARIS.

Jahrbuch der Kaiserlich-königlichen Geologischen Reichsanstalt. Vol. XXIV, No. 3, for July, August and September, 1874.

Verhandlungen der K. K. Geologischen Reichsanstalt, No. 12, 1874.

GEOLOGICAL SOCIETY OF VIENNA.

Hand-List of Seals, Morses, Sea-Lions, and Sea-Bears in the British Museum. By Dr. J. E. Gray, F. R. S., &c., Keeper of the Zoological Department.

A Guide to the Exhibition Rooms of the Departments of Natural History and Antiquities of the British Museum.

TRUSTEES OF THE BRITISH MUSEUM.

Bulletin de la Société Impériale des Naturalistes de Moscou, No. 2, 1874.

Nouveaux Mémoires de la Société Impériale des Naturalistes de Moscou. Vol. XIII, Part IV.

IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW.

Bollettino della Società Adriatica de Scienze Naturali in Trieste. No. 1, December, 1874.

ADRIATIC SOCIETY OF NATURAL SCIENCE OF TRIESTE.

Description des Poissons Fossiles provenant des Gisements Coralliens du Jura dans le Bugey, par feu Victor Thiollière.

AGRICULTURAL SOCIETY OF LYONS.

Commemorative Notice of Louis Agassiz. By Theodore Lyman.

AMERICAN ACADEMY OF ARTS AND SCIENCES.

Tijdschrift voor Indische Taal-Land. En Volkenkunde, uitgegeven door Het Bataviaasch Genootschap van kunsten en Wetenschappen. Vol. XXI, Parts 3 and 4. Vol. XXII, Parts 1 to 3.

Notulen van de Algemeene en Bestuurs—Vergaderingen van het Bataviaasch Genootschap van Kunsten en Wetenschappen. Vol. XII, Nos. 1 to 3.

NETHERLAND SOCIETY OF SCIENCE OF BATAVIA.

Commencement of the Second Christian Epoch or Christ is coming. By a Christian.

THE AUTHOR.

A Manual of Telegraph Construction. By John Christie Douglas.

THE AUTHOR.

Hindu Music from various Authors, compiled by Sourindro Mohun Tagore. Part I.

THE AUTHOR.

The Christian Spectator for April, 1875. Vol. IV. No. 46.

THE EDITOR.

Ramayan, Vol. V, No. I. By Hema Chundra Bhattacharya.

THE EDITOR.



General Report on the Operations of the Great Trigonometrical Survey of India during 1873-74. By Col. J. T. Walker, Superintendent of the Survey. (Two copies.)

SUPERINTENDENT OF TRIGONOMETRICAL SURVEY OF INDIA.

General Report on the Revenue Survey Operations, of the Upper and Lower Circles, for season 1873-74. By Col. J. E. Gastrell and Lieut.-Colonel J. Macdonald.

SUPERINTENDENTS OF REVENUE SURVEY.

Report on the Administration of the Registration Department in Bengal for 1873-74. By T. F. Bignold, Esq., B. A., Offg. Inspector-General of Registration.

General Report on Public Instruction in Bengal for 1873-74.

Annual Report on the Insane Asylums in Bengal for the year 1873. By J. Campbell Brown, C. B., Surgeon General, Indian Medical Department.

Papers relating to the Famine in Bengal and Behar, 1873-74. Vol. II.

GOVERNMENT OF BENGAL.

Report of the Committee for the revision of English, Telugu, and Tamil School Books in the Madras Presidency.

GOVERNMENT OF MADRAS.

*Purchase.*

The American Journal of Science and Arts, Vol. VII. Nos. 47 and 48, November and December, 1874.

No. 47. *B. A. Gould* :—On the Number and Distribution of the Bright Fixed Stars. *E. H. Bogardus* :—The Deportment of Titanium with re-agents in Iron Ores containing Phosphoric Acid. *H. P. Armsby* :—Experiments on the Decay of Nitrogenous Organic Substances. *W. Ferrel* :—Relation between the Barometric gradient and the Velocity of the Wind. *J. D. Dana* :—On Serpentine Pseudomorphs, and other kinds from the Tilly Foster Iron Mine. Putnam Co., New York.

No. 48. *F. W. Clarke* :—On the Molecular Volume of Water of Crystallization. *A. M. Mayer* :—On a new method of investigating the Composite Nature of the Electric Discharge. *J. Brocklesby* :—On the Periodicity of the Rainfall in the United States in relation to the Periodicity of the Solar Spots. *J. D. Dana* :—On Serpentine Pseudomorphs, and other kinds from the Tilly Foster Iron Mine, Putnam Co., New York.

The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science, Vol. 48, Nos. 321, 322, 323.

No. 321. *H. Herwig* :—The Heat-conducting Power of Mercury independent of the Temperature. *A. M. Mayer* :—Researches in Acoustics. *F. Guthrie* :—On an Absolute Galvanometer.

No. 322. *F. Guthrie* :—On Salt Solutions and Attached Water. *E. J. Mills* :—On Aniline Derivatives. *P. Smyth* :—Carbon and Hydrocarbon in the Modern Spectroscope. *A. M. Mayer* :—On a new Method of investigating the Composite Nature of the Electric Discharge. *J. L. Saret* :—On Polarization by Diffusion of Light. *Prof. A. S. Herschel* :—On the Spectrum of the Aurora.



No. 323. *W. M. Watts* :—Carbon and Hydrocarbon in the Modern Spectroscope. *Dr. Attfield* :—Note on the Spectrum of Carbon. *L. Schwendler* :—On the General Theory of Duplex Telegraphy. *Sir James Cockle* :—On Primary Forms.

The Annals and Magazine of Natural History. Vol. 15, No. 86.

*M. Ussoir* :—Zoologico-Embryological Investigation. *W. Ferguson* :—Description of a supposed new genus of Ceylon Batrachians. *James Wood-Mason* :—On the Genus *Deidamia*, v. W. S.

Quarterly Journal of Microscopical Science, No. 57, January, 1875.

*F. H. Welch* :—Observations on the Anatomy of *Tænia mediocanellata*. *C. H. Golding Bird* :—Imbedding in Elder Pith, for Cutting Sections. *W. Archer* :—On Apothecia occurring in some Seytonematous and Sirosiphonaceous Algæ in addition to those previously known. *E. R. Lankester* :—Observations on the Development of the Cephalopoda. *H. C. Sorby* :—On the Chromatological Relations of *Spengilla flaviatilis*. *Prof. Huxley* :—On the Classification of the Animal Kingdom.

Journal of the Society of Arts, Nos. 1157, 1158, 1159, 1875.

The Quarterly Review, No. 275, January, 1875.

The Doctrine of the Jesuits. The English Bar and Inns of Court. The Judicial Investigation of Truth.

The Edinburgh Review, No. 287, January, 1875.

Lord Ellenborough's Indian Administration. The Agricultural Labourers of England. Progress of Law Reform in England.

Exotic Butterflies, being illustrations of new species, by W. C. Hewitson. Part 93 for January, 1875.

Comptes Rendus Vol. LXXIX, Nos. 22, 24, 25, 26, 1874 and Vol. LXXX, Nos. 1 to 4, 1875.

Revue des deux Mondes, 4 vols. from 15th December, 1874 to 1st February, 1875.

Journal des Savants, November and December, 1874.

Revue Archeologique, Vol. XII, December, 1874.

Mevue et Magasin de Zoologie, Nos. 10 and 11, 1874.

Pratna Kamru Nandini, or the Hindoo Commentator, Vol. VII. No. VIII.

#### Exchange.

The Athenæum, for December, 1874 and January, 1875.

The Geographical Magazine, edited by C. R. Markham, C. B., Vol. II, Nos. 2 and 3.

Nature, Nos. 274 to 278.







PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR MAY, 1875.

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The Monthly General Meeting of the Society was held on Wednesday, the 7th instant, at 9 P. M.

T. Oldham, Esq., LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentation was laid on the table—

A Copy of “Trudbi Imperatorskago Petersburg, kago Botanicheskago Sada, Tome III, pt. I.,” from the Director of the Imperial Botanical Garden, St. Petersburg.

The following gentlemen duly proposed and seconded at the last meeting were elected ordinary members—

Dr. E. W. Chambers.

Dr. J. F. P. McConnell.

R. E. Carrington, Esq.

The following are candidates for ballot at the next meeting—

A. Chennell, Esq., proposed by Mr. Wood-Mason, seconded by Mr. A. W. Chennell.

Dr. G. Thibaut, Anglo-Sanskrit Professor, Benares College, proposed by Mr. H. Blochmann, seconded by Captain J. Waterhouse.

Mr. J. G. Apear, Barrister-at-law, proposed by Dr. Partridge, seconded by Captain J. Waterhouse.

Mr. A. C. Lyall and Bábu Ganga Prasád Siñha have intimated their desire to withdraw from the Society.

The following letters were read—

1. From MR. R. B. SHAW, *Yárkand*, to the HON'BLE MR. E. C. BAYLEY, C. S. I., dated *Yárkand*, 26th February, 1875.

MY DEAR MR. BAYLEY,—‘I was much interested in reading your letter of the 11th December. I shall be only too happy to act on the suggestions



which you make for procuring antiquarian information. I have been trying to obtain some, but the frequent revolutions in this country seem to have destroyed most traces of antiquity. I have, however, obtained a good number of MSS., from which I hope to collect materials towards filling up the gap in the history of this country between the times of Mirzá Haidar and the present day. Of pre-Islamitic times there are but few traces left. Khotan probably contains more, witness the coin which you mention. In that centre of early Buddhism with its numerous monasteries, there can scarcely fail to be some relics of antiquity discoverable.

‘I have given notice at all the brass-founders’ shops in Yárkand of my wish to purchase any old coins that may be on their way to the melting pot, but have as yet only succeeded in getting comparatively recent ones with the names (almost illegible) of various Khojas. But I have now discovered the man who obtained the coin you mentioned. At least he described it to me as the image of a four-legged animal on one side and unknown writing on the other. He says he sold it for three tangas (ten annas) to the Pandits left behind by Captain Trotter. I have now despatched him to Khotan with sufficient funds and with orders to make vigorous search for a month in all likely places. He says the coin was found by some men digging in the river banks for gold dust, and bought from them by his brother-in-law. The place was not Kiria, but Doshambih Bázár near Khotan.

‘Kiria is not deserted, but is a town of some 4000 houses, and was visited by Mr. Johnson in 1865. It is just on the verge of the desert, which is supposed to be the site of the towns overwhelmed in the sand.

‘I hear that not long ago some images were discovered in the crumbling banks of one of the rivers of Khotan, but that private diggings are not allowed. If this is the case, I have no doubt I shall be able to get assistance and information from the Dádkhwáh of Yárkand, who is well disposed (as are all the authorities) to help us in all our (to their eyes) curious whims; and who is moreover a learned man and interested in the past. I had been hoping to take advantage of the good dispositions of the authorities to investigate several old monuments bearing unknown inscriptions (probably in Uighur characters), which I hear of in this country, but our plans are now so unsettled that I fear this must be given up. I am, however, making a plunge into the mysteries of the Saríkol and Wakhán dialects, but their interest is purely philological. Without a literature, no antiquarian results are to be obtained for them, excepting in the possibility of tracing some early extension of that section of the Indo-European race over wider areas, by the light of surviving names of places explicable in this dialect.’



2. *A letter from MR. L. B. B. KING, Officiating Collector of MálDAH, to the Government of Bengal, dated MálDAH, 29th March, 1875.*

‘In reply to your No. 480, dated the 13th ultimo, I have the honor to enclose some brief notes on remaining ruins of Gaur, with reference to obtaining from them specimens of carved or coloured bricks, ornamental tiles, and mouldings.

‘Some of the best specimens of workmanship would lose most of their value, interest, and beauty, by being removed from where they stand, and Government would probably not wish any avoidable injury to be done to the few ancient buildings that now remain.

‘I would, therefore, propose to make a selection from fragments which have become detached, or are found carried away from the buildings to which they belonged, and from portions of buildings likely soon to fall of themselves.

‘I would solicit any further instructions you can afford me on the subject after reference to the notes enclosed on the several buildings, and in particular would ask to be informed how many such specimens are required, and whether any inscriptions should be sent as well.

‘Ornamental bricks and tiles are not likely to be ancient. The most interesting relics are stone carvings, which may have been appropriated by the Muhammadans from very ancient Hindú remains.’

*Notes on the removal of relics from Gaur.*

1. The Khwájah-kí-masjid, or small golden mosque, built of stone in the reign of Sulṭán Husain Sháh, the king of Gaur, who died 927 Hijrí, is in good preservation. There are three large stones detached opposite the northern gate, the carved tops of which might be sliced off and sent as specimens of the workmanship to Calcutta. The pillar to the right of the doorway will fall when an old tree which has grown into it has decayed. Some stones from this pillar would have interest, and might be removed without doing great injury. There are other handsome carvings on the door, but I could not recommend their removal.

2. In the neighbourhood, at the house of Nazr ‘Alí Sháh, a descendant of a spiritual guide of Aurangzib, I saw three large stones with inscriptions; the largest beautifully carved. They are said to be 250 years old. It is not known when they were brought to where they now are. They should be obtained from their present possessor.

3. The *Rújbibí* mosque is small, built of bricks, and did not strike me as interesting; specimens of carved bricks are, however, obtainable from it.

4. The *Daras* mosque, so called from a college which stood near, is a handsome brick building. An inscription now on a new mosque at English



Bazar is supposed to belong to the former, which, if so, was built in 907 Hijrī, by Sultān Husain Sháh. Some of the interior carvings have been carried off, and it would be a pity to take away any of those which remain. I brought with me a few carved bricks which I found lying about, but they are not fair specimens of work.

5. The *Gunnut* mosque is a large stone building without inscription. There are no mouldings remaining, nor anything characteristic, which could be removed. Gold ornaments and coins are said to have been found in a fresh dug hole inside, respecting which I am making inquiry. There is some ornamental stucco work within the building.

6. The *Chorkhánah*, called also Chika masjid, from the bats which now fill it, is situated near the palace, and is supposed to have been either a court-house or a prison. It appears, and is said, to be very ancient, but bears no inscription. Some not very good specimens of coloured bricks might be taken without great harm from the doorway.

7. Near the palace is the *Lukka Chhippi*, a two-storied and imposing-looking city gate. There is nothing characteristic which could be sent from it, nor from tombs which adjoin, one of which, Fath Khán's, is well preserved, but shows little skill in workmanship.

8. The *Qadam Rasúl*, a small square mosque of brick, has been attributed to Husain Sháh, but, according to the inscription, was built by his son Nuçrat Sháh in 937 Hijrī, in honor of the prophet's foot-print, which is preserved within. The carved brick front is in good repair, and should be kept entire. The inscription in front of the building is legible and well preserved. An inscription belonging to another building has been placed over the gateway. The top of a stone pillar lies in the compound, but is not worth removing.

9. The *Dakhal Darwázah*, a large city gate of brick, was built by Husain Sháh. An inscription belonging to it has been referred to above. The building is a fine strong one, in excellent preservation, only the south face, in which trees have taken root, is likely to fall. A complete flower in brick-work to the left, and the whole of a carving in brick above the doorway, might be removed from this side, as they will probably be lost in a few years, and are fair specimens of the work. The north side is better preserved, and being likely to last long, should not be touched. Inside are some very beautiful brick carvings, resembling stone; but these ought not to be removed.

10. The Golden Mosque, *Soná masjid*, sometimes called "Bárah-darí", built by Nuçrat Sháh in 932 Hijrī, is the remains of a fine stone building; a slab which formed part of the base of one of several carved arches, is detached, and might be removed and the carved side sent. Many of these arches have been entirely spoiled; no injury should be done to those which



remain. There is a carved stone fallen from the outside wall, which might be cut and sent, but it is less interesting than the former.

11. The remains of the palace wall (Báis-gazí) are remarkable for strength and height, but have no artistic interest. The carting away of bricks from these has been put a stop to of late years.

12. The minaret of Pirasa is a high tower, with remains of a room at the top. There are good stone carvings at the entrance to the stair, some feet above the ground, but they should not be taken.

13. The well preserved brick carvings on the 'Umar Qází mosque are good, and should be kept intact.

14. The *Lattin mosque*, which was entirely built of coloured bricks, has no inscription or record of date. The work, even in its present state, has a pleasing effect as a whole, but fragments of it would have comparatively little interest. I brought away some fallen bricks, but these became spoiled from lying on the ground, and give no fair impression of the structure.

15. The remains of Chánd Saudágar's buildings are a large number of grey and black polished stone-pillars, none worth removing, and only interesting as they stand.

16. There are variously coloured bricks in an old secular building, called *Ohumkatti*, and as these are likely to fall (from a tree having spread its roots among them), some might pardonably be removed as specimens.

17. The *Koṭwáli Darwázah* is a handsome city gate of brick, in excellent preservation. If an inscribed stone on the roadside, less than a mile off, belong to it, the building was constructed by Sulṭán Mahmúd Sháh in 860 Hijrí. Nothing that would be a specimen of the work could be taken from it.

18. I saw two old mouldings built into houses in a village, Mahdípur, near Gaur, one very beautiful and excellent as a specimen, though somewhat injured by a fire. I would obtain possession of both.

The President said that the Council in a letter to the Government of Bengal had approved of Mr. King's suggestions. It was desirable that the ancient buildings in Gaur should be preserved intact as far as was practicable. In the selection of carved bricks, &c., three sets should be formed, one for the Asiatic Society of Bengal, one for the British Museum, and the third for the Berlin Museum, the authorities of which through Dr. Jagor had applied for specimens. But all inscriptions should be sent to the Asiatic Society of Calcutta, where there were already several slabs from Gaur. Thanks were due to Mr. King for his interesting note.



The following papers were read—

1. *Algarum species in India orientali centrali a S. KURZ collectas determinavit* DR. G. ZELLER.

No. 3518. SPIROGYRA DUBIA, Kg. forma typica et var. longiarticulata mixtae.—Allahabad, in aqua stagnante fluminis Ganges.

No. 3519. SPIROGYRA IRREGULARIS, Naeg.—Mujgowan, in ditione Rewa versus Jabalpure.

No. 3520. CLADOPHORA MACROGONYA, Kg. tab. phyt. IV. 36 (Conferva macrogonya, Lyngb.).—Allahabad, in fluvio Jumna frequens.

No. 3521. OEDOGONIUM n. sp.? cellula basali palmatiloba, curvata, sursum parum incrassata, articulis  $\frac{1}{8}$ — $\frac{1}{4}$ ''' crassis, diametro ad 10-plum. longioribus, ad genicula non striatis; fructicationibus ignotis.—Rewa, Mujgowan, in rivulo ad saxa.

No. 3522. SPIROGYRA SUBAEQUA, Kg.—Allahabad in flumine Ganges.

No. 3523. OSCILLARIA JUMNAE, Z. nov. sp.—Strato tenui, olivaceo, filis rectis, pallide aeruginosis v. lutescentibus, articulis diametro ( $\frac{1}{8}$ — $\frac{1}{4}$ ''') triplo brevioribus, ad genicula serie unica v. duplici pulchre granulatis, linea delicatissima dimidiatis, apiculo attenuato oblique truncato, cytioplasmate dilute aerugineo, granuloso. (O. percursae affinis).—Allahabad, in fluvio Jumna.

No. 3524. VAUCHERIA KURZII, Z. nov. sp. Caespitosa, sordide viridis, aetate fuscescens, thallo flaccido, ramoso, oogoniis undique egredientibus, parvis, plerumque ternis, interdum solitariis, geminis seu quaternis, pedicellatis, globosis, ( $\frac{1}{8}$ — $\frac{1}{4}$ ''' diam.) ore laterali producto rostellatis, sporodermate achroo involutis, antheridiis sparsis, rectis.—Rewah, Mujgowan, in rivulo ad lapides.

No. 3525. OEDOGONIUM TENELLUM, Kg.—Allahabad, in flumine Ganges ad Zannichellias frequens.

No. 3526. MESOCARPUS SCALARIS, Hass.—Rewa, Mujgowan, in rivulo ad saxa.

No. 3527. SCHIZOTRICH AURANTIACA, Kg. var. crassa, Z.—Vaginis ad  $\frac{1}{8}$ ''' crassis filis inclusis plerumque solitariis, apice obtusis,  $\frac{1}{8}$ — $\frac{1}{4}$ ''' crassis, raro binis et pluribus tenuioribusque, articulis diametro aequalibus vel parum brevioribus, saepe obsoletis.—Bengalia inferior, ad arbores in orientali parte ditionis Sunderban.

2. *On the Khyeng People of the Sandoway District, Arakan.*—By MAJOR G. E. FRYER, M. S. C., Deputy Commissioner Sandoway.

(Abstract.)

The Secretary read the first part of the paper, which contains census tables, details of measurements of skulls and limbs, and gives an account



of the customs and manners of Khyengs, or Hiou or Shoo, as they call themselves. The second and third parts contain a grammatical analysis of the language of the tribe and a Khyeng-English and an English-Khyeng Dictionary. The article will appear in No. 1 of this year's Journal.

Mr. Wood-Mason remarked that he was quite prepared to be told that the tribe which formed the subject of his friend Major Fryer's interesting paper were dolichocephalic; for he himself had measured numerous skulls belonging to various closely-allied mongoloid tribes inhabiting the hill-ranges of our N. E. Frontier, but had not hitherto met with a single instance in which the transverse diameter of a skull exceeded eight-tenths of its length. He had also examined, at the request of Sir George Campbell, the crania of eleven members of the party of Kúki chiefs which had recently visited Calcutta under the charge of Captain Lewis, with the following result:—

Lushai, male (No. 1)	was orthocephalic, his cephalic index being	·74
"    "    (No. 2)	subbrachycephalic " " "	·78
"    "    (No. 3)	" " " " "	·77
"    "    (No. 4)	orthocephalic " " "	·756
Rathey " (No. 5)	subbrachycephalic " " "	·79
Lushai " (No. 6)	orthocephalic " " "	·74
"    "    (No. 7)	" " " " "	·74
"    "    (No. 8)	mecocephalic " " "	·73
"    "    (No. 9)	orthocephalic " " "	·74
"    "    (No. 10)	mecocephalic " " "	·72
"    "    (No. 11)	" " " " "	·73
A skull of a female of the same tribe was mecocephalic, " "		·71

Of these eleven males, taken as a whole, it would be seen that no one had a cephalic index so high as ·8; that three were subbrachycephalic, three mecocephalic, and the remaining five orthocephalic, the degree of long-headedness termed orthocephaly greatly preponderating: in connexion with which it was interesting to note that the mean ceph. index was ·748, or also orthocephalic, and that the only female examined in accordance with the usual rule, was larger headed than the longest headed male. In reply to the author's assertion that in females the extreme transverse diameter of the skull was, in proportion to the length, greater than in males, which was tantamount to saying that males were longer-headed than females, all he would say was, that whenever any such difference between the sexes had been observed, it had been exactly the reverse of that asserted. In conclusion he thanked the author for the most interesting paper that, for a long time, it had been his lot to listen to.



Mr. Schwendler then gave an interesting account of the peculiar habits of the "red cat-bear," *Ailurus fulgens*, and illustrated his remarks by exhibiting a living specimen, which he received some months ago through the kindness of Captain Hartopp, who obtained the animal from Darjiling.

He stated that the animal was first described by Cuvier, who referred it to a special *genus*, of which, however, up to the present time it is the only *species* known. General Hardwicke was the discoverer of the animal, and in Jerdon's "Mammals of India" a very good description of it will be found.

Mr. Schwendler called special attention to the peculiar manner in which the cat-bear feeds. It takes a piece of bread soaked in milk into its mouth, and then throws back its head, so that the piece of bread slips down into its throat by its weight, after which it begins to swallow. If the piece of bread is not quite in the right position in its mouth, the little animal makes use of one of its forepaws in a most comical manner to put it right.

The animal is said to be very rare, and has probably never reached Europe alive. It lives at from 7,000 to 12,000 feet above the sea level, in the South-Eastern ranges of the Himálayas. It seems, however, to be standing the hot season of Calcutta very well.

The general form of the body is that of a bear; it has the tail of a fox, the head between that of a cat and a fox, and the ears of a lynx. Mr. Schwendler said, the various animals in his deer-park were not the least afraid of the bear-cat—not even when it was a stranger in the place. It was quite a different thing, he said, when last year he introduced a young panther (*felis parvus*), scarcely half the size of the bear-cat, into the park. Then the whole deer-park was in a commotion, the spotted deer (*axis maculatus*) giving their peculiar cry of fear and stamping with their fore-feet; the fawns seeking the protection of their mothers; the pheasants taking up the signal; the black buck scampering to and from with their deep peculiar grunt; the graceful gazella Indica observing and hissing at short intervals; the *cervulus aureus*, at other times quite tame, running in its peculiar hopping style all round the park and barking; and even the samburs (*rusa Aristotelis*), large as they are, with tail erect, head thrown up, and lifted foot prepared for battle.

The above facts prove almost conclusively that the *Ailurus fulgens* is not carnivorous—at any rate so far as the deer tribe is concerned.

The President remarked that now that the scheme of a Zoological Garden for Calcutta had been taken up by the Lieutenant-Governor of Bengal, its establishment was sure to become a fact, and he hoped Government would soon carry out the project, so as not to be deprived of Mr. Schwendler's valuable assistance.



## LIBRARY.

The following additions have been made to the Library since the Meeting held in April last.

*Presentations.*

\*.\* Names of Donors in Capitals.

Journal of the East India Association. Vol. VIII, No. 3.

EAST INDIA ASSOCIATION.

Bulletin de la Société de Géographie, for January and March, 1875:

L'ABBE' ARMAND DAVID, Voyage en Mongolie (avec carte).—LE COMTE MARES-CALCHI, Notes géographiques sur la Birmanie Anglaise suivies de quelques mots sur les Shans et sur les Kabyens de la Birmanie indépendante.—Notice sur Thanh-Hoa, province du Tongking.

SOCIÉTÉ DE LA GÉOGRAPHIE, PARIS.

Mittheilungen der Schweizerischen Entomologischen Gesellschaft. Vol. IV, Pt. 6.

SOCIÉTÉ ENTOMOLOGIQUE SUISSE.

Trudbi Imperatorskago Petersburgkago Botanischekago Soda. Tome III., Pt. I.

THE DIRECTOR OF THE IMPERIAL BOTANICAL GARDEN OF ST. PETERSBURG.

Monatsbericht der Königlich-Preussischen Akademie der Wissenschaften. November and December, 1874.

OLSHAUSEN, Ueber den Ursprung und die verschiedenen Bedeutungen des persischen Wortes Pahlaw und über den Sinn des Wortes Mäh in den Benennungen vieler persischer Oertlichkeiten.—WEIERSTRASS, Zur Theorie der eindeutigen analytischen Funktion einer Veränderlichen.—SIEMENS, Beiträge zur Theorie der Legung und Untersuchung submariner Telegraphenleitungen.

BERLIN ACADEMY.

The Christian Spectator for May, 1875. Vol. IV, No. 47.

EDITOR.

A report on Sanskrit MSS. in Native Libraries, by Rájendralála Mitra.

AUTHOR.

Notes on the Saka Samvat and Gupta Eras, by James Fergusson.

AUTHOR.

Vocabulary of Dialects spoken in the Nicobar and Andaman Isles, by F. A. de Roepstorff.

Yayurveda Sanhita. Nos. 4 and 5.

HOME DEPARTMENT, GOVERNMENT OF INDIA.

General Report on the Operations of the Great Trigonometrical Survey of India during 1873-74.

REVENUE DEPARTMENT, GOVERNMENT OF INDIA.

Minute by the Hon'ble Sir Richard Temple, K. C. S. I., Lieutenant-Governor of Bengal, on the late Famine.

GOVERNMENT OF BENGAL.



A Catalogue of Sanskrit MSS. in private libraries of the N. W. Provinces.

GOVERNMENT, N. W. PROVINCES.

General Report on the Topographical Survey of India and of the Surveyor-General's Department, for 1873-74.

SURVEYOR GENERAL.

Memoirs of the Geological Survey of India. Records of the Geological Survey of India. Vol. VIII, Pt. I, 1875.

Annual Report of the Geological Survey of India for 1874.—F. STOLICZKA, The Altum Artush considered from a Geological point of view.—F. FREDDEN, On the evidences of "Ground Ice" in Tropical India during the "Talchir Period".—J. W. HUGHES AND H. B. MEDLICOTT, Trials of Raniganj Firebricks.

SUPERINTENDENT, GEOLOGICAL SURVEY OF INDIA.

Journal of the Agricultural and Horticultural Society of India.

Vol. IV., Pt. II. T. M. FRANCIS, Notes on the propagation of Plants by leaves.—REV. T. A. C. FERMINGU, Cultivation of the Mahogany tree in Bengal.

Vol. V., Pt. I. BARON FERDINAND VON MUELLER, Note on *Eucalyptus globulus*, the genuine Blue Gum tree.

AGRICULTURAL AND HORTICULTURAL SOCIETY.

#### *Purchase.*

The Calcutta Review. No. 70, April, 1875.

Annalen der Physik und Chemie. Vol. 154, Pts. I and II, 1875.

F. BRAUN, Ueber die galvanische Leitungsfähigkeit geschmolzener Salze.—F. KOHLRAUSCH UND O. GROTRAIN, Das elektrische Leistungsvermögen der Chloride von den Alkalien und Alkalischen Erden so wie der Salpetersäure in wässrigen Lösungen.—H. WEBER, Zur Theorie des Galvanometer.—W. A. NIPPOLDT, Ueber die Wahl des Querschnitts von Blitzableitern.—M. SEKULIC, Ueber die an bestaubten und unreinen Spiegeln sichtbare Interferenz Erscheinung.—E. WIEDEMANN, Ueber die Leitungsfähigkeit der Halbidverbindungen des Bleies.

#### *Exchange.*

The Indian Antiquary. Vol. IV, Pt. 42, May, 1875.

PHEAR, Glimpses of old India as seen through the pages of Manu.—McCORKELL, A legend of old Belgám.—MISS E. LYALL, Biographies of Asvagosha, Nagarjuna, Aryadeva, and Vasubandhu, translated from Vassilief.—MAJOR J. W. WATSON, Speculations on the origin of the Chávaḍas.—C. H. TAWNEY, Metrical translation of Bhāṭṭriharis Nīti Sātakam.

Nature. Nos. 279 to 282.



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR JUNE, 1875.

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The monthly General Meeting of the Society was held on Wednesday the 2nd instant at 9 o'clock P. M.

T. Oldham, LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table :—

1. From the Author, a copy of a work entitled—"The Fair at Sakhi Sarwar," by M. Macauliffe, Esq., B. A.

2. From the Author, a copy of a work entitled—"Uttra Rám Charita" and another entitled "Malavikagnimitra," by C. H. Tawney, Esq., M. A.

3. From the Asiatic Society of Japan, Transactions, Vol. III, Pt. I, 1874.

4. From Captain J. Waterhouse, a set of Photographs taken at Camorta, in the Nicobar Islands.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members—

A. Chennell, Esq.

Dr. G. Thibaut.

J. G. Apcar, Esq.

The following are candidates for ballot at the next meeting—

C. Girdlestone, Esq., C. S., Resident at Nepal, proposed by H. B. Medlicott, Esq., seconded by Captain J. Waterhouse.

Montgomery G. Stewart, Esq., Calcutta, proposed by Dr. T. Oldham, seconded by Mr. H. Blochmann.

Mr. F. Black, District Engineer, Hamirpur, proposed by V. A. Smith, Esq., seconded by Captain J. Waterhouse.

J. R. E. Gouldsbury, Esq., Pleader, Chief Court, Montgomery, Panjáb, proposed by M. Macauliffe, Esq., C. S., seconded by H. Blochmann, Esq.



Letters were read—

1. From W. Theobald, Esq., laying before the meeting, at the request of Mr. H. H. Locke, two perforated stone implements found in the bed of the river Mun at Kharakpúr, together with the following extract from a letter from E. Lockwood, Esq., Collector of Mongher, detailing the particulars of their discovery.

"I am sending you two fine specimens of stone implements which I heard of when I was at Kharakpúr on Thursday and which I have just received. You may rely on their being genuine, although the hole in the smaller stone appears as fresh and smooth as if made yesterday. (Chisel marks which I saw in the quarries beneath Jerusalem made by workmen in the days of Solomon appear equally fresh).

"These stones were lately found in the bed of the river *Mun* at Kharakpúr.

"This river is being dammed up at a vast expense by the Darbhanga estate, under the Court of Wards, and deep foundations are being made in the river bed for a wall to join the two hills through which the river runs.

"I enclose the note from Mr. Inman, Superintendent of Works, which came with the stones.

"The smaller stone was found 16 feet below the river bed.

"Years ago this river was the resort of many wild animals.

"The surrounding hills are metamorphic.

Extract from Mr. Inman's letter to Mr. Lockwood—

"I have much pleasure to send you two remarkable perforated stones which I wish to present to your museum. I also send you several other stones found in the same locality, some having the shape of mangoes and one of an oyster, the rest are simply water worn.

"The smallest one was found 10 feet from the coffer dam, the largest close by the dam, near the bags, and within ten days of each other. They were not amongst any soil, but imbedded in a complete mass of large and small stones, and the largest stone must have been about the same depth as the smallest, 16 feet. If any thing it was deeper by a foot, say 17 feet from surface, so far as I can remember."

Mr. Theobald writes—

"It is not easy to say very positively to what purpose these articles were put, but I think the suggestion of Dr. Oldham, to whom I showed them, is the correct one, that they are portions of the upper stones of 'Querns' or hand mills. The circular hole in the middle displays considerable polish such as alone could have been produced by rotation on a fixed axis. Doubtless the original size of these articles was much greater; and it is very desirable that any other objects, even though in a fragmentary condition, should be forwarded to the Geological Survey Office, where every facility exists for



their due comparison and determination—and where an admirable series of ‘palæolithic’ and ‘neolithic’ implements has already been brought together.

“The antiquity, however, of these implements is probably very inconsiderable, and the probability is great, that other objects of cotemporaneous industry will be found in the same layer whence these were extracted, if diligent search be made.”

Mr. Ball said—

“For comparison with the perforated stones now exhibited I have brought to the meeting the highly finished hammer-stone which was described and figured by me in the Proceedings for April 1874. I have also brought a volume of the American Naturalist for 1873 in which, since my paper was published, I have found descriptions and figures of perforated stones which are said to occur in great abundance on both banks of the Susquehanna river near the small town of Muncy in Lycoming country, Pennsylvania. The resemblance between these hammer-stones and mine from Mopani is very striking, with this exception, however, that the hollows on the opposite faces of the pebbles were not generally carried sufficiently deep to meet, and so cause an actual perforation. This is, however, the case with some of the European implements.

I quite agree with Mr. Rau, the writer of the paper, that these stones were not suited to the manufacture of flint flakes, as has been suggested by some authorities.

To those who believe in an Asiatic origin for the North American Indians, the fact I have pointed out may, perhaps, be not without interest.

The perforated stones exhibited by Mr. Locke, and which I see now for the first time, are of too soft material to have been used as hammer-stones. Whatever may be their supposed antiquity, the use they can have been put to, is I should think, extremely doubtful.

2. From the Assistant Secretary to the Government of Bengal forwarding the following correspondence with a report by Mr. H. J. H. Fasson on a Whirlwind which occurred in the Maimansingh District on the 26th March, 1875.

No. 77, dated Dacca, the 22nd April, 1875.

*Memo. by F. W. PEACOCK, ESQ., Officiating Commissioner, Dacca Division.*

Copy, with the enclosure in original, submitted to the Government of Bengal, Judicial Department, for information. This storm, which occurred exactly one week after the one reported in my memorandum No. 60, dated 30th ultimo, was not so destructive, though its violence would appear to have been greater.



2. Both appear to have been of exactly the same character. It is most fortunate that the damage done has, comparatively speaking, been so slight.

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No. 562, dated Camp, Jamálpúr, the 18th April, 1875.

*From R. H. PAWSEY, Esq., Officiating Magistrate of Maimansingh.  
To The Commissioner of Circuit, Dacca Division.*

I have the honor to forward herewith, for your information, a report from Mr. Fasson, Assistant Magistrate of A'tiah, giving the details of the ravages of a whirlwind in the neighbourhood of Nagarpúr, and about 18 miles south-west of the sub-divisional head-quarters, on the evening of the 26th March.

2. The loss of life was not so serious as in the storm near Ishwarganj, reported to you in this office letter No. 524, dated 8th instant, nor was the destruction of property anything like so extensive, but the violence of the wind appears to have been irresistible in its limited course.

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No. 5, dated Tangail, the 8th April, 1875.

*From H. J. H. FASSON, Esq., C. S., Assistant Collector of A'tiah.  
To The Collector of Maimansingh.*

With reference to your No. 485, dated 2nd instant, I have the honor to submit the following account of the atmospheric disturbance which resulted in the partial destruction of the villages of Uladah and Chanbárá on the 26th March, 1875. I visited and carefully examined the ravaged tract myself and obtained the fullest information available from the villagers and the injured persons in the dispensary. Their accounts were necessarily fragmentary, confused and imperfect, but there is no doubt as to the general character and course of the storm.

2. It was simply, though on a large and tremendous scale, such a swirling eddy in the hot sultry air as may often be observed on a hot day catching up leaves and dust, whirling away over a field or so in a rapidly developed swirling pillar of dust, and then subsiding and dissipating as it had arisen.

3. In this instance the duration of the whirlwind was probably less than twenty minutes at the outside; the breadth of its path just 250 yards; the length of its course from formation to dissipation a little over two miles. Its course was almost exactly from south-west to north-east. The time of its occurrence was just after dusk, or about an hour after sunset. The cattle were in the cow-houses, the people for the most part busied in their *baris*.

4. Due west from Shakhairliá Khál the great river Jamuná flows in a single stream some three miles wide, with the Pabna shore beyond. Look-



ing south-west from the same spot, there lies in the midst of the stream a large chur, the breadth of water between the khal and this chur being about a mile. Somewhere in this mile-broad stream the eddy arose. Boats moored along the chur felt no disturbance. The day had been hot without a breath of wind. Clouds lay in the south-west quarter only. About an hour after sunset, the eddy, already a roaring whirlwind, carrying with it a swirling waterspout some 10 feet in height, judging from the height of the water-mark on the bank, struck the eastern bank of the river at Shakhairlia Khál. Here were moored eighteen large boats, most of them freight-carrying masted boats of many maunds burden. All these were instantly overturned, shattered, stove in, or flung on shore; one large boat was lifted bodily into the air, carried over the bank 15 feet in height, and dashed to pieces in a field some 30 yards inland; another small boat, carried a somewhat shorter distance, lies in a field, with the keel smashed in and the ends split open. A large boat lifted up, overturned, and flung down on the beach, struck down a man, crushed him into the sand beneath it, and killed him. Another man, carried off his feet, was dashed down and killed. A third man struck down, and his skull fractured by some fragment, lingered some half-hour and died. Another *khál*, some 300 yards to the north, remained tranquil and undisturbed. The whirlwind passed on north-eastward over some half mile of maidan covered with cheena crops. Here no trace of its progress appears, the crops are unhurt, and not even flattened, but show no sign. Then came the village of Uladah, stretching north and south some half a mile. In a moment the hurricane had passed through, leaving a strip 250 yards broad of utter devastation, while all remained untouched to the north and south of its path. In this strip not a house was left standing; the roofs were whirled off, the walls stripped away; the wooden posts torn away with such violence as to break up and disintegrate the earthen *bhitus* in which they had been fixed. All the plantain trees were wrenched off or uprooted; twelve large mango trees were torn up by the roots; all the trees that remained standing were stripped off their branches, large and small, which were snapped off close to the trunk. A pool of water in the midst of the village is heaped up with broken branches. The bamboo clumps were twisted round and laid flat, the stems being broken up near the roots. In this village 140 *ghars* were destroyed, 17 people were hurt, some badly, and seven cattle killed. A dead cow was found among the broken branches of a mango tree some thirty feet above the ground. The whirlwind continued its north-east course across a maidan of more than a mile, covered with cheena for the most part. Here, again, it left no trace, except where a long slip of bushes ran along an *ail* parallel with the direction of the storm. These were flattened. Then the storm struck the northern end of the village of Chanbári, part of the path passing clear of the village to the



north, and encountering nothing but a fence a foot high edging a field; this it destroyed, breaking off and throwing down the branches of which it consisted. That part of the whirlwind which struck the village encountered first a dense mass of tall "*baint*" jungle, such as would afford cover for leopards. This was beaten down flat, as though it had been thoroughly trampled by beating elephants. Chats, mats, and beams lie confusedly amongst the flattened and prostrate masses of "*baint*." Beyond the *baint* lay the bamboos and *báris* of the village; these were destroyed as in the former village, the devastation here being equally complete, and the breadth of the path the same, some fifty yards of it passing clear of the village to the north-south of the whirlwind's path; the plantains, bamboos, *báris*, and jungle stand entirely intact and undisturbed. In this village 89 *ghars* were destroyed, 19 people injured, one woman killed. No cattle were killed or hurt. This, the people explain by saying that the cowhouses bore the brunt of the storm, and were whirled off, leaving the cattle safe, while the people running out into the open were struck down by branches of trees and other whirling debris. Everything was over in a moment. This village stands at a bend of the river Lohai, which comes down towards it from the north-east, and turns off south-eastward, passing the east of the village. The whirlwind then passing the village entered upon the course of the river, and passing upwards a short distance along the north-eastern bend of the stream, gradually dissipated itself and sank to rest. The course was thus, as here sketched, about 250 yards broad and two miles in length.

5. No one seems to have seen the approach of the wind in either of the villages, from which it seems that it must have travelled fast, though the onward course of a storm of this kind is not necessarily rapid; it is the rapidity of the whirling motion that does the mischief. But alike at the *khál*, at Uladah, and at Chanbári, the story is, "we suddenly heard a booming, whirling sound as loud as the firing of cannon; all became dark, but with a sort of fiery glare in it; there was a sense of suffocation from the tremendous whirling of the air, and in a moment everything was swept off and whirled away in all directions. In a minute it was all over." The weather was hot and clear up to the moment of the whirlwind; after it passed, heavy rain immediately followed. I asked a wounded woman how her child escaped. She showed me by gathering it up and crouching over it on hands and knees, saying this was what she did when the storm struck them.

6. It does not appear from the debris whether the revolution was from right to left or from left to right; the broken plantains and flattened bamboos lay in different directions. One *ghar* in the edge of the path was merely crushed in, the posts being broken and the roof fallen inwards; but everywhere else the wall and roofs were stripped off upwards and carried



clear away. Many *ghars* of Chanbári were carried into the Lohai river. One or two bamboo clumps remain strangely intact with ruin all around them. All the people speak to a fiery appearance or ruddy glare; some who looked from the khal after the storm had passed, say they at first imagined the villages would take fire, as the whirlwind reached them. It must be remembered too that it was all but dark at the time. I do not remember to have anywhere read of the appearance presented by a whirlwind of this kind in the dark. There might probably have been electrical disturbance involved in the phenomenon. All speak, too, to the loud, booming sound with a sort of pulsation in it: "shob, shob, shob" is the imitation they give. This would be the sound naturally produced by the rapid whirling of the air.

7. The storm was thus strictly a whirlwind, springing up in a sultry calm, travelling in a straight north-easterly course; with a diameter of 250 yards; with an internal motion of whirling and ascension, and doubtless a tranquil centre of revolution round which the air swirled upwards like a funnel, and dissipated as it had arisen after a course of about two miles.

8. The villages concerned are situated about 18 miles south-west of Tangail and 5 miles north-east of Nagarpúr. The loss suffered has been only of the huts and broken crockery. The crops have not suffered at all, and there was hardly any loss of cattle.

Mr. H. F. Blanford said that, although whirlwinds were very ordinary phenomena the one described was, nevertheless of special scientific interest, since it seemed to have originated over the bed of a large river, instead of over hot plains, as is generally the case.

Mr. W. G. Willson said that, whirlwinds of this class were by no means rare in Bengal. A short account of one which occurred near Sátkhírá, in the 24-Parganahs, at 6 P. M. on the 25th of April, 1872, had been communicated by him to the Society at the June meeting of the same year. It was very similar, as regarded extent, direction of propagation, duration and extraordinary violence, to the whirlwind so graphically described in Mr. Fasson's letter. He had received several brief notices of similar tornadoes in the Nadiá district. Two had occurred in the thannah of Bhadalia in 1874; one on the 11th of February, the other at 5 P. M. on the 16th of September. There were also records of whirlwinds in the same district in April 1871 and in September, 1872.

3. From W. B. Martin, Esq., Deputy Collector and Magistrate, Madhipúrah, Bhágulpúr, forwarding an inscription found at Srínagar, near Madhipúrah.

MY DEAR MR. BLOCHMANN,—I send you a second rubbing, the words of course, can easily be seen to be "Magurdhaj Jogi 100." I send a small



sketch with it to show you on what part of the stone the inscription was found. I will now describe the village, and tell you what little I can gather about its history.

‘The village is called Srínagar and is situated about 10 miles north-west by west of Madhipúrah.

‘The centre of the village is on a raised piece of ground, and immediately at the bottom of the western slope of this high ground is situated a fort about 400 yards square with an entrance on one side only facing east. On the northern extremity of the ground is a high mound, said to be a “baiṭhak” or sitting-place; due west of this baiṭhak, north of the fort, and about equidistant from both, is the ruined temple from which I got the inscription. This temple seems to have been made of Rájmahal stone, clamped, or rather rivetted, together with iron; the room (only one, as usual in modern temples) is about 8 feet square with stone walls still visible, about 2 feet high. At the doorway stand three slabs, two carved as shewn in my sketch, and one simply cut in steps longitudinally. The piece (marked B in sketch) seems to have been the piece which went over the doorway, but evidently the *lower* portion was not the *lowest* stone *above* the door—this is clearly missing. A few pieces were lying here and there but formed only steps or portions of the walls, two pillars stood opposite the doorway about 20 feet from it. The door faces west. Having told you this much, I must tell you what the natives say about the place. “Srínagar was one of the chief towns in the ráj of Sebai Singh, a Bhor Rájá. On his death he left three sons, Bijol Deb, Kop Deb, and Siri Deb. Siri Deb built a fort in this village and called the village, from that time Srínagar. He alone, or with his brothers’ help also, dug two high tanks, one near Parmánpúr south west of Srínagar, and one west of his Srínagar fort, the former called Kopo or Ghopa, the latter Harsar, both still distinguishable, the former clearly so. Bijal and Kop “garhs” are, too, still visible. These stones are Buddhist stones.” This is the story as related, but from the good state of preservation in which I find the fort, and wretchedly dilapidated state of the temple, and from other stories about the Bhors, I should say the temple is by far the older building, and the Bhors had nothing to do with its *erection*, though they evidently used the building and bricked up the tottering walls to keep them standing. In a Gosain’s hut, now on the spot, there are two Rájmahal stone “Ganeshes” and two “lings” with their stone basins.

The President announced that the late Assistant Secretary, Bibu Pratápachandra Ghosha having resigned, Mr. G. S. Leonard had been appointed Assistant Secretary with an agreement for two years, after probation for three months, at a salary of Rs. 200 per mensem.



Also that the Council had appointed Col. H. Hyde, R. E., a Trustee of the Indian Museum on the part of the Society in place of Mr. W. S. Atkinson, resigned.

The President laid before the meeting the following report of the Stoliczka Memorial Committee, and stated that on the recommendation of the Committee steps had been taken to procure a bust of the late Dr. F. Stoliczka, but the Committee hoped to obtain a portrait also if funds permitted.

### STOLICZKA MEMORIAL FUND.

The Stoliczka Memorial Fund Committee think it desirable to furnish the subscribers with information as to what has been done regarding the memorial in Calcutta and London.

The subscriptions to the Stoliczka Fund, collected and promised in India up to the 31st December, 1874, amounted to Rs. 1,670, according to the first list issued by the Committee. The subscriptions up to date amount to Rs. 1,908. In October last, a Branch Committee was formed in London, regarding which Dr. F. Day writes as follows:—

“A meeting was held on October 16th, in the rooms of the Zoological Society, 11, Hanover Square, to take into consideration the most appropriate mode of raising a memorial to the late Dr. Ferdinand Stoliczka.

“General Strachey, R. E., F. R. S., having been voted into the chair and the circular of the Stoliczka Memorial Committee having been read, it was resolved—

“That this meeting desirous of cooperating with the Committee formed in Calcutta for the procuring of some permanent memorial of the late Dr. Ferdinand Stoliczka, requests

General R. Strachey,  
Arthur Grote, Esq.,  
Dr. Day,  
Dr. Dobson,  
H. F. Blanford, Esq.

to act as a Committee to make arrangements for the collection of subscriptions and to superintend the preparation of such memorial as may be decided upon in communication with the Calcutta Committee.

“That Arthur Grote, Esq., be requested to act as Honorary Treasurer to the Fund and Dr. Day be requested to act as Honorary Secretary.

“That a circular be sent to persons likely to be interested in the object in view, informing them of the steps which have been taken and soliciting their subscriptions.



"The following sums have been promised prior to the despatch of the circular—

General Strachey,.....	£10
T. Oldham, Esq., L.L. D., .....	10
F. Drew, Esq.,.....	2
Dr. G. Dobson, .....	3
E. Alstone, Esq., .....	2
H. F. Blanford, Esq., .....	5
W. T. Blanford, Esq., .....	5
Dr. F. Day, .....	10
Major Godwin-Austen, .....	5
Surgeon-Major W. H. Rean, .....	5

The total amount hitherto subscribed amounts therefore to Rs. 2,478.

The charges against the Fund are as follows :—

Printing, Postage, &c., .....	Rs.	68	9	0
Exchange on Rs. 1,892, say, .....	,,	189	0	0

Total Rs...	2,204	7	0
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With regard to the shape which the Testimonial should take, most of the subscribers in India, and the Committee itself, believed that the existing photographs of the late Dr. Stoliczka were too little varied to furnish materials for a bust, and it was thought that a portrait for the Meeting Room of the Asiatic Society of Bengal would, under these circumstances, be the most appropriate Memorial. The Committee also adopted the suggestion made by Mr. H. B. Medlicott to devote any surplus balance to the erection of a memorial tablet in Dr. Stoliczka's birthplace. The English Committee, however, appear to possess sufficient materials for a bust, as will be seen from the following extract from another letter by Dr. Day—

"All Subscribers were agreed that a bust to be presented to the Asiatic Society of Bengal would be the most fitting memorial to Dr. Stoliczka's memory, for which purpose we possess sufficient photographs in the opinion of an eminent sculptor.\* The cost of a bust and pedestal, carriage to Calcutta, &c., will amount to probably £200.

At a meeting of the Indian Committee held on the 17th May, it was decided that a bust would be the most suitable form of memorial; but that, if possible, a portrait should also be obtained, and it was resolved—

"That the Committee of the Stoliczka Memorial Fund in India feel greatly indebted to the Committee in London for their hearty cooperation in the procuring of a memorial to the late Dr. Stoliczka. The sum already

\* Mr. Timothy Butler, the artist who made Dr. Falconer's bust from photographs.



subscribed amounts to more than £200, and the Committee therefore solicit the Committee in London to make arrangements with Mr. Butler for an early commencement of a bust of the late Dr. Stoliczka. They would also request to be informed of the proceedings in London, and of the amount subscribed from time to time.

“As the Committee in India are very anxious to obtain also a portrait of the late Dr. Stoliczka should funds permit, they will communicate from time to time any additional subscriptions obtained in this country.”

It was further resolved that a circular should be addressed to the members of the Society and to others interested in the matter stating what the Committee had done and soliciting further aid and subscriptions, from those members who have not already subscribed, to enable them to carry out their object in the manner proposed.\*

*List of Subscribers to the Stoliczka Memorial Fund, in India.*

Dr. J. Baxter, .....	Rs.	10	0	0
Col. C. B. Mainwaring, .....		10	0	0
Dr. J. Wise, .....		16	0	0
Syed Ahmed, ... ..		20	0	0
Dr. S. B. Partridge, .....		50	0	0
Dr. W. J. Palmer, .....		16	0	0
Col. J. T. Walker, R. E. ....		16	0	0
Col. R. Maclagan, R. E. ....		10	0	0
S. Kurz, Esq. ....		50	0	0
Babu Udoy Chand Dutt, .....		5	0	0
Munshi Newal Kishore, .....		5	0	0
Capt. J. Waterhouse, .....		20	0	0
M. L. Dames, Esq. ....		10	0	0
D. Waldie, Esq. ....		40	0	0
Hon'ble Raja Romanath Tagore, C. S. I., .....		50	0	0
Capt. W. F. Badgley, .....		32	0	0
Major J. W. H. Johnstone, .....		10	0	0
Dr. G. King, .....		16	0	0
V. Ball, Esq. ....		32	0	0
S. E. Peal, Esq. ....		50	0	0
A. V. Nursing Rao, Esq. ....		100	0	0

\* Since the above report was issued, the Committee have received intimation that the Austrian Government have voted the sum of £100 for the purpose of obtaining a bust of the late Dr. Stoliczka to be set up in the University at Vienna, and that it would be possible to have a copy of the bust for £70 or 80. They have therefore considered it desirable to countermand the order for the bust from England pending the receipt of a photograph of the Vienna bust, when they will be able to decide whether they will take the copy or order a new one from England.



W. Theobald, Esq. ....	Ra.	16	0	0
R. B. Foote, Esq. ....		10	0	0
H. B. Medlicott, Esq. ....		16	0	0
Capt. W. G. Hughes, ....		50	0	0
The Members of the German Club, Calcutta, ....		400	0	0
R. S. Brough, Esq. ....		20	0	0
E. H. Man, Esq. ....		10	0	0
Major G. E. Fryer, ....		50	0	0
Ganga Prasad, Esq. ....		10	0	0
A. B. Fisher, Esq. ....		25	0	0
J. M. Foster, Esq. ....		25	0	0
W. J. K. Wagentreiber, Esq. ....		10	0	0
Dr. R. A. Barker, ....		10	0	0
Dr. T. R. Lewis, ....		20	0	0
D. C. J. Ibbetson, Esq. ....		10	0	0
R. Chisholm, Esq. ....		40	0	0
Raja Joykishore Das, ....		20	0	0
Khwajah Ahsanullah, ....		50	0	0
W. E. Brooks, Esq., ....		20	0	0
Munshi Amir Ali, ....		20	0	0
Maharaja of Vizianagram, ....		100	0	0
A. Anderson, Esq. ....		20	0	0
Dr. D. D. Cunningham, ....		20	0	0
F. Schlegel, Esq., ....		20	0	0
L. Schwendler, Esq. ....		50	0	0
Col. H. Hyde, ....		100	0	0
Col. H. L. Thuillier, C. S. J., ....		16	0	0
Hon'ble E. C. Bayley, C. S. I., ....		50	0	0
Hon'ble Sir Richard Temple, K. C. S. I., ....		16	0	0
Right Revd. Dr. Milman, Lord Bishop of Calcutta,		50	0	0
J. Wood-Mason, Esq., , ....		50	0	0
Capt. J. Biddulph, ....		16	0	0

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Total subscribed in India to 30th April, 1875, Rs .. 1908 0 0

Total do. in England to 31st October, 1874, £57, ... 570 0 0

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Total Rs. .. 2,478 0 0

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Mr. Blochmann, at the request of Col. H. Hyde, exhibited a set of Bengal coins, one of which—a posthumous A'zam Shâhî of 812 A. H.—was exhibited by the Hon'ble Mr. E. C. Bayley in August last (*vide* also J. A. S. B., 1874, p. 294, note). The fact that these Bengal coins were



found in Northern Bihár, is an additional proof that Northern Bihár belonged to Bengal during the time that Southern Bihár belonged to the kingdom of Jaunpúr (J. A. S. B., 1873, Pt. I, p. 221). Mr. Bayley selected several for his own cabinet; of the twenty-six left, there were—

6 A'zam Sháhís, of types published by Mr. Thomas in J. A. S. B. 1867, p. 69.

2 posthumous A'zam Sháhís, dated 812.

18 Jaláluddín Muhammad Sháhís, of 818, 819, 822, 823, 826.

Col. Hyde kindly allowed the Society to select a few, and seven coins have thus been secured for the Society's cabinet, viz., 2 posthumous coins of A'zam Sháh, dated 812, and 5 Jaláluddín Muhammad Sháhís, dated 818, 819, 822, 823, 826.

Mr. Blochmann laid before the meeting several readings of Muhammadan inscriptions received from Capt. H. C. Marsh, 18th Bengal Cavalry, and Mr. T. W. Beale, A'grah. He said—

The readings sent by Capt. Marsh are from the Jámi' Mosque in Sri'nagar, Kashmir. The first belongs to the Mosque itself; the other is from a *báoli*, or well, opposite the principal entrance; and the third, a decree from the Emperor Sháh Jahán, is from the entrance of the mosque. The second and third inscriptions were published in the Journal of the Society for 1864 (p. 278) by the late Revd. I. Loewenthal.\* The first inscription, I find, is also given in the Persian history of Kashmir, entitled *Wáq'i'át i Kashmir*, and written in A. H. 1148 by Muhammad A'zam, and in the Urdú translation of the work printed in 1846, at the suggestion of Dr. Sprenger, by Munshí Ashraf 'Alí of Dihlí. The reading is (metre, long *hazaj*)—

نخستین مسجد جامع ز شه اسکندر ثانی • عمارت یافت و آنکه سوخت از تقدیر ربانی  
دگر باره حسن شه آنکه بود از نسل پاک او • بشد بانی این مسجد هم از توفیق یزدانی  
ولیکن از دو جانب نه ستون آراست نه سقفش • ز ابراهیم احمد ماکری شد راست تا دانی  
ز هجرت نه صد و نه بود تا دور محمد شاه • که این جنت سرا شد زینت دین مسلمانی  
بتاریخ هزار و بست و نه از هجرت سید • بروز عید روزه سوخته در نوبت ثانی  
ملک حیدر رئیس الملک در عهد جهانگیری • نهاد از نوبنایش باز روز عید قربانی  
چو تاریخ بنایش جست گفتا هاتف غیبی • نهاد از نو اسمش باز گاه عید قربانی

1. At first, the Jámi' Mosque was built by Sháh Sikandar, the second [Alexander]; and according to God's decree, it burnt down.

\* In Mr. Loewenthal's *Bdoli* inscription, J. A. S. B., 1864, p. 286, we have to read *سرچشمه* for *چشمه* in l. 5; and *مبئعش* for *منبعش* in l. 6. The *tárikh* has been wrongly added up; for the year in which Mahmúd built the well was 1152 A. H., or A. D. 1739, but not 1056 A. H.



ز نور سکه شاه جهانگیر ابن شاه اکبر • بفروردین زر آگره فروزان گشت چون اخگر  
۱۰۳۰

From the light of the coinage of the emperor Jahāngir, son of the emperor Akbar, Agra money became in Farwardin as plentiful as the stars. A. H. 1030 [A. D. 1620].

*The tomb of Sayyid Núrullah Shustarí.*

Sayyid Núrullah, a Shí'ah, was an inhabitant of Shustar in Persia, and came to India in the time of Akbar, who appointed him Qází of Láhor. In the reign of Jahāngir he was summoned to A'grah, where during a religious discussion, it is rumoured, he made some unpleasant remarks about Shaikh Salim Chishtí of Fathpúr Síkri, to whose prayers Jahāngir believed to owe his existence. The emperor, in a great passion, ordered that his tongue be cut out from the back part of his neck, and his body be dragged by an elephant through the streets of the city. His tomb, which is of white marble, is on a high *chabútra* near the village of Nagla Padi, close to the Roman Catholic burial ground in A'grah. The inscription is—

مرقد منور سید نور الله شوستری  
ظالم کو از جفا نور الله • قره العین نبی را سر برید  
سال قتل حضرتش ضامن علی • گفت نور الله سید شه شهید  
سنه ۱۰۱۹ هجری  
بعد جهانگیر بادشاه سعادت فایز شدند سنه ۱۰۱۹ هجری

*The shining tomb of Sayyid Núrullah Shustarí.*

1. He was a tyrant who cruelly beheaded Núrullah, the beloved of the Prophet.
2. Zámín 'Alí found the year in which the saint was murdered in the words "Núrullah Sayyid has become a martyr". A. H. 1019 [A. D. 1610]. He obtained the blessing of martyrdom in the reign of Jahāngir, A. H. 1019.

Nawáb 'Alí Naqí Khán, the minister of the ex-king of Audh, came to A'grah in the latter part of A. D. 1871, and ordered a 'Dálán' to be erected over the grave. He died at Lak'hnaú in December of the same year; but the Dálán was finished in 1290, or A. D. 1873, as recorded on the following inscription over the entrance (*Rubá'í* metre)—

نواوة باغ مصطفی نور الله • شاه ظالم شهید کردش ناگاه  
فرمود علی نقی مزارش تعمیر • گشتند جمیع مومنینش همرا  
سال تعمیر این مبارک روضه • جنات نعیم مرقد نور الله  
سنه ۱۲۹۰ هجری

1. Núrullah, a young sprout of the Prophet's garden, suffered martyrdom at the hand of a cruel emperor.
2. 'Alí Naqí ordered his tomb to be built up, and all the faithful joined him.
3. The *darikh* of the erection of the sacred mausoleum lies in the words—"Sweet Paradise is the resting-place of Núrullah." A. H. 1290. [A. D. 1873.]



Regarding Núrullah, *vide* my *Ain* translation, I, p. 545.

Nurábád, near Dholpúr.

*The Tomb of Ganná Begam.*

"Ganná Begam was celebrated for her personal accomplishments, as well as for the vivacity of her wit and the fire of her poetical genius. Several of her lyric compositions in the Urdú language are still sung and admired. She was the daughter of Nawáb 'Alí Qulí Khán, a mansabdar of 5000 horse, who was commonly called 'Chhangá' or 'Shash-angushtí', from his having six fingers on each hand. She was betrothed to Shujá'uddaulah, the son of Nawáb Safdar-jang of Audh, but afterwards married to Nawáb 'Imád-ul-mulk Gháziuddín Khán, prime minister of the emperor 'Alamgír II.; and this rivalry is said to have in part laid the foundation of the enmity which afterwards subsisted between that Wazír and Safdar-jang. Adjoining to the village of Núrábád near Dholpúr, two miles from Chhotá Sarái, is a pretty large garden, the work of the emperor Aurangzib 'Alamgír, built in the year 1100 A. H. (1688 A. D.), over the gate of which is an inscription bearing the chronogram of the year of its erection, (metre, *khafif*—the first miçra' is not metrical)—

کرد باغی بذلای شه عالمگیر \* فیض بخش جهان چو مهر منیر  
بهر تاریخ او چو کرد سوال \* گفت هانف که دیده باغ جمال

۱۱۰۰

"Within this garden is the monument of Ganná Begam. Her shrine bears the following inscription:—

آه غم گنا بیگم

Alas! a sigh for Ganná Begam!

"The inscription is a chronogram; hence she died in A. H. 1189, or A. D. 1775."

The poets Saudá and Mír Qamaruddín Minnat often corrected her verses. A poem by the latter was translated and published by Sir W. Jones in the 1st Volume of *Asiatic Researches*; but it is there wrongly ascribed to Ganná Begam. She wrote under the *nom-de-plume* of 'Manzar.' *Vide* also Sprenger, *Catalogue of Oudh MSS.*, p. 227; Garçin de Tassy, *Lit. Hind.*, I, p. 488.

'Ganná' means 'sugarcane ripe for cutting.'

Mr. Blochmann also read the following letter received from Mr. Beale on a Persian MS., entitled '*Imárát ul-Akbar*, which is the best work we possess on the buildings in Agrah from Akbar's time.

'About the year 1829-30, a student of the Agrah Government College, by the name of Munshí Chhítar Mal, a káyasth, by the orders of Doctor James



Duncan of Agra, wrote a book entitled 'Imárat-ul-Akbar, عمارات الاكبر, on all the buildings of the reign of the emperor Akbar, wherein he gives a detailed account of the edifices which were then to be seen at Agra.

'Although this book was written at the same time when Síl Chand wrote his تفريع العمارات, I do not know, how Síl Chand's book was approved of by Government and made public, and that of the other man, rejected.

'It seems that Síl Chand had given the measurement of all the lands in Agra in bighahs and biswas, which was the only thing Government wanted to know; hence his work was approved.

'I am quite sure, the Asiatic Society has never seen the work written by Chhítar Mal. It is certainly a most valuable work, and the Society should keep a copy of it; and if it be translated by you into English, it would make a most splendid work.

'This book was fortunately brought to me by a friend and I now send it to you by book post, so that the Society may take a copy of it, and return it to me as soon as possible, as I myself wish to take a copy of the same, and return it to its owner.'

The following papers were read:—

1. *On some Stone Implements of the Barmese type, found in Pargana Dalbhum; District of Singbhum, Chota-Nagpur Division.*—By V. BALL, M. A., F. G. S.

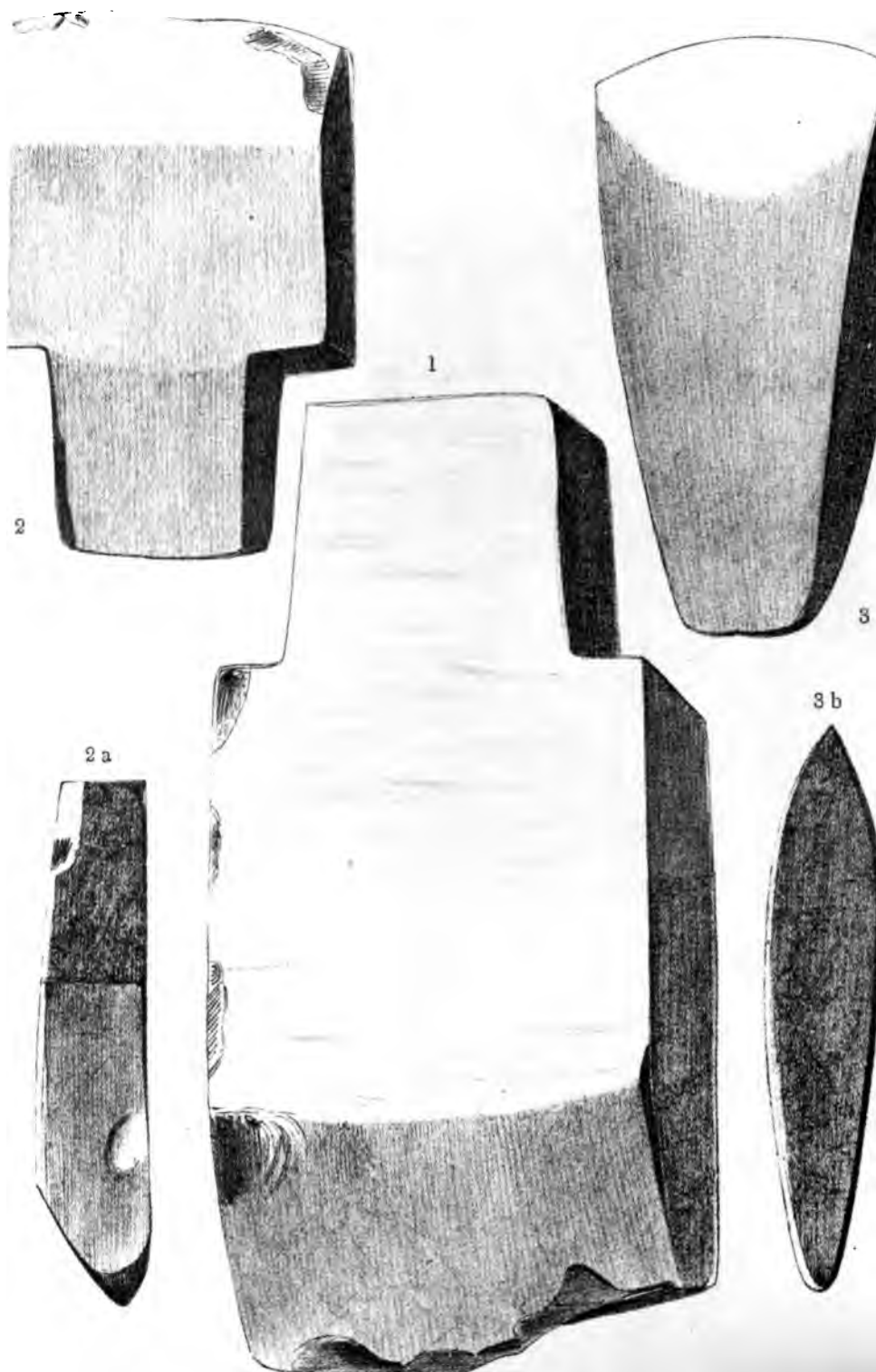
From time to time I have laid before the Society\* specimens of more or less well-formed stone implements from Chota Nagpur. With one exception these, whether flakes or of the chipped axe shape, would, I suppose, by those who employ the term, be classified as *palæolithic*. On the present occasion, however, I am enabled to exhibit some of a completely different character, one in fact, which in this part of the world at least, has been found to belong exclusively to the stone implements from Barmá and the adjoining countries.

The history of this discovery is as follows: When passing through the station of Chaibassa last November, Mr. Ritchie, the Superintendent of Police gave me the larger specimen and promised to get for me some others of which he had heard and also, as far as possible, to trace out the facts connected with their discovery. Subsequently, in January, he forwarded to me the two other implements and the following mythical account of their origin which he received from the natives.

The large adze was found "about two years ago by one Baidonath Perdan of the village of Kyma Pattra (on the west side of the Súbanríká river and not far from that river) in his sugarcane field embedded in the

\* P. A. S. B. 1865, p. 127; 1867, p. 143; 1868, p. 177; 1870, p. 268; 1874, p. 96.





STONE IMPLEMENTS FROM SINGHBHUM  
(natural size.)

*Zinographed at the Surveyor's Office*



1. The first part of the document is a list of names and titles, including "The Hon. Mr. Justice" and "The Hon. Mr. Justice".



earth about 3 feet or so from the surface. The *Perdan's* story is, that during the night preceding the finding of the implement, there had been a violent storm with thunder and much lightning, some of which flashed unpleasantly close to the village. That on going into his sugarcane field next morning he found the cane within a radius of 10 feet or so all burnt, singed and scorched up in a most surprising manner. He judged that the destruction had been caused by lightning, as no doubt it had. That his curiosity being excited by the crater-like appearance of the soil at the very centre of the circle of destroyed sugarcane he dug down with a view to ascertaining what might be there, and found the adze in a perfectly vertical position edge downwards. It was then in the same condition with broken edge as it is now.

The smaller adze has no particular history attached to it. It was obtained from a villager who could only say that his father—now dead—had found it somewhere in the jungle.

With regard to the wedge-shaped stone, Mr. Ritchie, on the authority of the Head Constable of Kokepara, states that "it was found by a man of Guru Banda (west side of Súbanriká) embedded in the very centre of the lower part of the trunk of a middling sized Mhowa tree (*Bassia latifolia*) which had evidently been struck by lightning and split in twain from top to the very lowest extremity of the trunk."

The popular notion according to Mr. Ritchie is that all these stones are thunderbolts. The same opinion is held by the people in Barma regarding the very similar implements found there.

The larger shouldered specimen (Pl. II, fig. 1) is formed of dark green, excessively dense and hard quartzite with a wavy structure and some included pebble-like masses of different composition. How far it may consist of pure quartz I cannot say as I have not chipped it and hardly like to do so. The other shouldered adze (fig. 2) is made of a black igneous rock, which shews a minute crystalline structure and can be readily scratched with a knife.

As regards the wedge-shaped stone (fig. 3) it has most mysteriously disappeared from my possession and I only retain a sketch of it; but so far as I remember, it appeared to be made of the same material as the larger adze.

In reference to the origin of these implements, their mineral composition is not, I believe, inconsistent with the view that they may have been manufactured originally in the part of the country where they were found. The source of the material from which the flakes I formerly exhibited to the Society were manufactured occurs within the district of Singhbhum. It is a bed of dark chert-like quartzite and from it the material of the large adze might very possibly have been obtained. Again the very numerous dykes



and intrusive masses of trappean rocks in Singhbhum may contain a material identical with that from which the smaller adze was manufactured.

On the other hand the close resemblance in form which they bear to the implements of Barma cannot fail to suggest a foreign origin for them. Unfortunately the stories of their discovery given above do not help us in forming an opinion as to their antiquity. It would be of course useless to attempt any speculation, on the strength of such data alone, as to an incursion or immigration of Barmese races into that part of Bengal in Pre-historic times; but the fact now recorded may hereafter be of importance should evidence of another character tending in the same direction be by any means established.

Mr. Theobald remarked on the great interest of the discovery by Mr. Ball in India, of stone weapons of the peculiar Barmese type. Not only are the weapons identical, but it must be remarked that their reputed origin is identical also, as in Barma the belief is universal that these stones descend in the lightning flash and are found only where a flash has struck.

2. *Scientific names of the Markhor and Sind Ibez, with a note on that of the Indian antelope.*—By W. T. BLANFORD, F. R. S., F. G. S.

(Abstract.)

The writer remarks that new names have recently been suggested for the wild goat or "ibex" of Sind, and for the Sulimán variety of the Markhor.\* Both however have long been known to naturalists. The Sind ibex is identical with the wild goat of Persia and Western Asia, and was chiefly known in former times as the source of the genuine bezoar. The animal described as *Capra bezoartica* by various old writers and by Linnæus himself cannot, however, be recognized, as these writers confounded different antelopes with the wild goat, the proper name for which is *Capra agagrus*.

The Sulimán Markhor is the *Capra megaceros* of Hutton, the Kashmir animal the *C. Falconeri* of Hügel, and if the two animals are the same, as most naturalists think, the latter name, which is the oldest, must be applied to them.

The name *Antilope bezoartica* applied to the Indian antelope by Blyth and Jerdon is incorrect. The true name is *Antilope cervicapra*.

Details of the synonymy are given in each case.

The paper will appear in the Journal, Pt. II, No. 1, 1875.

3. *On some recent evidence of the Variation of the Sun's Heat.*—By H. F. BLANFORD, Esq.

(Abstract.)

After referring to Messrs. Meldrum and Lockyer's discovery in 1872 of the apparent variation of the rainfall of the globe, coincidently with the

\* Proc. As. Soc. Bengal. 1874, p. 240.



number and extent of the spots on the sun's surface, and to Professor Köppen's discovery, published in 1873, that the temperature of the lower atmosphere in the tropics varies almost inversely as the number of the spots, he noticed the papers of Mr. Joseph Baxendell published, in 1867, some years before either of the above, in the Memoirs of the Literary and Philosophical Society of Manchester.

Mr. Baxendell had endeavoured to ascertain whether the sun's heat radiated to the earth underwent any periodical variation corresponding to the variation in the state of his surface, and, by an indirect but ingenious treatment of his data, had succeeded in showing that there was good reason for an affirmative conclusion. Then, remarking on the peculiar advantages for investigating all solar phenomena offered by India, and that it was very desirable that Mr. Baxendell's results should be confirmed by more direct evidence, he proceeded to give the results of the observed temperatures of the exposed black-bulb thermometer during the last seven years at Port Blair and ten stations in India. These observations showed an average rise of nearly six degrees in the temperature of the sun's radiation between 1868 and 1870, and a decline of about three degrees since 1872, 1867 having been the epoch of minimum spots and 1871 the maximum. This represented the effects of the sun on the land surface, and was probably only a fraction of the total variation at the limits of the atmosphere.

Comparing this result with that obtained by Professor Köppen, it followed that, as the heat of the sun increased, so the warmth of the lower stratum of air diminished, and *vice versa*,—a conclusion somewhat unexpected, and at first sight apparently anomalous. Mr. Blanford suggested that the explanation of this anomaly might perhaps be found in Messrs. Meldrum and Lockyer's law of the rainfall, supposing it to be fairly established. The Indian temperature records show that, both on short and long periods, the temperature of the lower atmosphere bears a certain inverse ratio to the rainfall, and it was easy to assign physical reasons for this observed fact, since, *ceteris paribus*, the more frequent the rainfall, the greater must be the quantity of cloud which intercepts the direct solar rays, and the greater the evaporation from the earth's surface, which also has a great cooling effect. Since the greater part of the earth is covered with water, the chief effect of increased radiation from the sun will be to increase the evaporation; therefore, as the subsequent effect, the quantity of cloud and the fall of rain; which is Messrs. Meldrum and Lockyer's result. The heat set free by the condensed vapour must doubtless raise the temperature of the upper strata of the air, those *viz.*, in which cloud is formed, but the lower strata will be affected in the opposite manner, which is the result obtained by Professor Köppen.

He concluded by pointing out the vast importance of the fact, once



established, that the sun's heat varies from year to year. The variation would seem to be so considerable, that it must have an appreciable effect on all terrestrial phenomena, (meteorology of course included,) for the sun's heat is well known to be the source of nearly all life and activity of every kind on the earth's surface. The variation in the absolute quantity of heat can be ascertained only from direct actinometric observations; and it is to be hoped that these will be undertaken before long at the new sun observatory to be established at Simla under Colonel Tennant.

The paper will appear in the Journal, Pt. II, No. 1, 1875.

Mr. W. G. Willson said, that no more interesting subject of investigation at the present time could have been selected by Mr. Blanford than the connection between variations of solar heat and the changes in the sun-spot area. This seemed to be the link required to establish, on a physical basis, Mr. Meldrum's law of connection between sun-spots and cyclones, as well as rainfall. Mr. Norman Lockyer appeared to consider a rainfall periodicity corresponding to that of the sun-spot area as fully established: (*Nature*, 12th December, 1872). He says that we "should no longer deceive ourselves as to the present state of meteorology. A most important cycle has been discovered analogous in some respects to the saros discovered by the astronomers of old." But it appeared to Mr. Willson that Mr. Meldrum, who first drew attention to the subject, and who subsequently examined tables of rainfall for 93 stations in various parts of the world; and Professor Brocklesby who had examined for the same purpose tables for 2,200 stations in America, were not equally sanguine. On the whole however they appeared to think that, amid striking anomalies, there was some evidence in favour of the supposed connection between rainfall and sun-spots. Mr. Willson had examined, in August last, tolerably extensive statistics of rainfall for a few stations, with the view of testing the supposed law. He had data for 10 maxima and minima sun-spot periods for Madras. For Bombay 8, for Calcutta 7, for Nágpur 4, for Greenwich 7 and for Rome 5. These he had put together side by side with the data given by Mr. Norman Lockyer in his paper in *Nature* before referred to. These data were 3 maxima and minima sun-spot periods for Port Louis, 3 for Adelaide and 5 for the Cape. The result of the comparison was not on the whole favourable to Mr. Meldrum's supposed law. Counting up, for all the the stations and for all the periods, the cases which were favourable and those which were unfavourable to the supposed law, he found that they were almost exactly evenly balanced, and it was to be remembered that the data given by Mr. Lockyer, which were included, were all favourable. However although no regular rainfall periodicity could be detected for the new stations examined, the total rainfall in maxima sun-spot periods was, for most of them, somewhat greater than that



in the minima periods. In the case of Calcutta, however, the rainfall in the minima sun-spot years was greater than that in the maxima years, and such was also true for Rome. For Greenwich the totals were almost equal.

Assuming however a rainfall periodicity, corresponding to that of the sun-spot area, to be established, he thought it was quite conceivable, as pointed out by Mr. Blanford, that while the maximum temperature indicated by the solar radiation thermometer varied directly with the sun-spot area, the temperature of the air near the surface might vary in an inverse manner in certain localities. An examination of the records of mean annual temperature derived from hourly observations in Calcutta showed that no periodicity was apparent. The mean annual temperature had in fact been practically constant for the last twenty years.

The reading of the following paper was postponed.

Pali Studies, No. 1, by Major G. E. Fryer, Sandoway.

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#### LIBRARY.

The following additions have been made to the Library since the Meeting held in May last.

#### *Presentations.*

••• Names of Donors in Capitals.

Proceedings of the Royal Society of London, January, 1875.—Vol. XXIII, No. 158.

*J. Norman Lockyer*—Remarks on a New Map of the Solar Spectrum.—*J. Tyndall*.—On Acoustic Reversibility. *W. H. Johnson*—On some remarkable Changes produced in Iron and Steel by the action of Hydrogen and Acids. *J. B. N. Hennessey*,—On the Atmospheric Lines of the Solar Spectrum, illustrated by a Map drawn on the same scale as that adopted by Kirchhoff.

#### ROYAL SOCIETY, LONDON.

Journal of the Royal Geological Society of Ireland, 1873-4. Vol. IV. Pt. I.

*J. E. Gore*.—Note on a bed of Fossiliferous "Kunkur" in the Punjab.

#### ROYAL GEOLOGICAL SOCIETY, IRELAND.

Journal of the Anthropological Institute of Great Britain and Ireland April and July, 1874. Vol. IV. No. I.

#### ANTHROPOLOGICAL INSTITUTE OF GREAT BRITAIN AND IRELAND.

Proceedings of the Literary and Philosophical Society of Liverpool. Vol. 28, 1873-74.

*Baron L. Benas*—Semitic Legends. *Robert Gordon*.—"Inscription on Burmese Bell, Liverpool Museum."—Translation from the Pali and Burmese. *C. H. Stearn and G. H. Lee*.—On the Expansion of the E line of the Hydrogen Spectrum, with plates.

#### LITERARY AND PHILOSOPHICAL SOCIETY OF LIVERPOOL.



Transactions of the Royal Society of Edinburgh. Vol. 27, Pt. II 1873-74.

ROYAL SOCIETY OF EDINBURGH.

Quarterly Journal of the Geological Society of London. Vol. XXXI. Pt. 1, No. 121, February 1875.

GEOLOGICAL SOCIETY OF LONDON.

Monatsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin, Januar, 1875.

Register für die Monatsberichte vom Jahre 1859 bis 1873.

THE ROYAL ACADEMY OF SCIENCES, BERLIN.

Journal Asiatique. Vols. IV and V, Nos. 80, 81, December and January, 1874-75.

ASIATIC SOCIETY OF PARIS.

Entomologische Zeitung, Nos. 1-3, January and March, 1874.

ENTOMOLOGICAL SOCIETY OF STETTIN.

Zeitschrift der Deutschen Morgenländischen Gesellschaft. Vol. 23, Pt. II.

GERMAN ORIENTAL SOCIETY.

Philosophie und Theologie von Averroes, by M. J. Müller.

AUTHOR.

Indian and Australian Snake-Poisoning.

SURGEON-MAJOR J. EWART.

On the Nature and Physiological Action of the *Crotalus*-poison as compared with that of *Naja tripudeans* and other Indian Venomous Snakes.

DR. FAYER.

Uttara Rāma Charita, a Sanskrit drama, by Bhavabhūti, and Mālavikāgnimitra, a Sanskrit play, by Kālidāsa, translated by C. H. Tawney, M. A.

AUTHOR.

Professional Papers on Indian Engineering edited by Major A. M. Lang, R. E. Vol. IV. No. 16.

EDITOR.

The Fair at Sakhi Sarwar, by M. Macauliffe, Esq., B. A., C. S.

AUTHOR.

Synopsis of the Results of the operations of the Great Trigonometrical Survey of India, Vol. IV. 1875.

HOME DEPT. GOVT. OF INDIA.

Yajur Veda Sanhita, edited by Samāsram.

HOME DEPT. GOVT. OF INDIA.

Report on the Judicial Administration (civil) of the Central Provinces for 1874.



Report on the Judicial Administration (criminal) of the Central Provinces for 1874.

Report on the Police Administration of the Central Provinces for 1874.

CHIEF COMMISSIONER, CENTRAL PROVINCES.

Report on the Administration of the Madras Presidency during the year 1873-74.

GOVT. OF MADRAS.

*Purchase.*

The Annals and Magazine of Natural History. Vol. XV. No. 87, March, 1875.

*H. N. Moseley*.—On *Pelagonemertes Rollestoni*. *Prof. Gray*.—Do Varieties wear out or tend to wear out? *W. King*.—Oceanic Sediments and their Relation to Geological Formations. *Gerard Krefft*.—Remarks on Professor Owen's Arrangement of the Fossil Kangaroos. *M. Ussow*.—Zoologico-Embryological Investigations. *Dr. B. N. Dybowski*.—On the *Gammaridae* of Lake Baikal. *M. A. Gaudry*.—On the discovery of true Batrachians in Palæozoic Rocks.

The Numismatic Chronicle and Journal of the Numismatic Society, 1874. Pt. IV.

*E. T. Rogers*.—Notes on some of the Dynasty of the Khalifahs of Bani-Umeya.

The Ibis, a quarterly Journal of Ornithology, 3rd Series. Vol. V. No. 17, January 1875.

*J. H. Gurney*.—Notes on a Catalogue of the *Accipitres* in the British Museum, by R. Bowdler Sharpe (1874). *H. E. Dresser*.—Notes on Severtzoff's "Fauna of Turkistan." *R. Swinhoe*.—Ornithological Notes made at Chefoo (Province of Shantung, North China).

The American Journal of Science and Arts. No. 49. Vol IX. January 1875.

*E. Loomis*.—Results derived from an examination of the United States Weather Maps for 1872 and 1873. *John C. Draper*.—Projection of the Fraunhofer Lines of Diffraction and Prismatic Spectra on a Screen. *C. S. Lyman*.—On Venus as a Luminous Ring.

The London, Edinburgh, and Dublin, Philosophical Magazine and Journal of Science. Vol. 49, No. 324, March, 1875.

*E. Bouty*.—Studies on Magnetism. *F. Guthrie*.—On Salt Solutions and Attached Water.

Journal of the Society of Arts. Nos. 1160 to 1163, Vol. XVII. February and March, 1875.

*Frederic Drew*.—The possibility of applying the Roman Alphabet generally to the Languages of India.—Silk Culture in Japan. Cacao cultivation in India. The Internal Trade of India. The Impracticability of adapting the Roman Character to the Alphabets of India.

The Academy.—Nos. 145 to 155. February, March, April, 1875.

The Doctrine of Descent and Darwinism, by Prof. O. Schmidt.

History of the Conflict between Religion and Science, by J. W. Draper, M. D.



Fungi, their Nature, Influence and Uses by M. C. Cooke, M. A., LL. D.

Animal Mechanism, a treatise on Terrestrial and Aerial Locomotion, by Prof. E. J. Marey.

Comptes Rendus Vol. 80, Nos. 5 to 8, February 1875.

No. 6. *M. Janssen*.—Lettre à M. Dumas, sur les résultats généraux de l'observation du passage de Vénus, au Japon. *M. d'Avout*.—Moyen facile d'obtenir sans instruments et avec une assez grande approximation la latitude d'un lieu.

No. 8. *M. J. B. Schnetzer*.—De l'action du borax dans la fermentation et la putrefaction. *M. Schützenberger*.—Sur la fermentation butyrique provoquée par les végétaux aquatiques immergés dans l'eau sucrée.

Journal des Savants. Janvier, 1875.

*M. E. Chevreul*.—Étude sur les quinquinas. A. de Quatrefages.—Étude sur les Todas.

Revue des deux Mondes. Vol. 7, Part IV. and Vol. 8, Part I. Février et Mars, 1875.

15. *Fev. M. E. de Valbezen*.—Les progrès matériels de l'Inde Anglaise—Les chemins de fer, le commerce et l'agriculture. *M. H. Blerzy*.—Études sur les travaux Publics—Les rivières et les canaux de la France—La canalisation des rivières, les barrages mobiles et les réservoirs artificiels.

1er Mars. *M. H. Blerzy*. Études sur les travaux Publics.—Les rivières et les canaux de la France—L'avenir de nos voies navigables, les travaux à faire.—*M. Juk, Patenôtre*.—Les Persans chez eux, notes de voyage—Recht, Cazbin, les routes et les villages.

Revue Archéologique. Nos. I. and II. Janvier et Février, 1875.

The Hindu Commentator. Vol. VII. Nos. 9 to 11.

#### *Exchange.*

The Athenæum. Pt. 564, February, 1875.

Nature. Vol. II. Nos. 283 to 286, April, 1875.

The Geographical Magazine. Vol. II. No. IV. April, 1875.

*Col. H. Yule*.—Trade routes to Western China. *Prof. A. Vambery*.—A Journey from Samarkand to Shehri-sebz and Bokhara.

Transactions of the Asiatic Society of Japan. Vol. III. Pt. I. Octobre to December, 1874.

*Dr. Geerts*.—Useful Minerals and Metallurgy of the Japanese. *H. Gribble*.—The preparation of Vegetable Wax.



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR JULY, 1875.

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The Monthly General Meeting of the Society was held on Wednesday the 7th instant, at 9 o'clock P. M.

T. Oldham, Esq., LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table:—

A medal from the Royal Norwegian University of Christiania.

From W. G. Willson, Esq., a copy of a Report on the Midnapur, Burdwan Cyclone of the 15th and 16th October, 1874.

From the Bengal Government a copy of Rig Veda-Sanhita, Part VI, edited by E. Max Müller, M. A.

The following gentlemen, duly proposed and seconded at the last meeting, were elected ordinary members—

C. Girdlestone, Esq., C. S.

Montgomery G. Stewart, Esq.

T. Black, Esq.

J. R. E. Gouldsbury, Esq.

The following are candidates for ballot at next meeting:—

C. J. O'Donnell, Esq., C. S., proposed by Mr. H. Blochmann, seconded by Captain Waterhouse.

J. F. Hewitt, Esq., C. S., proposed by Mr. H. B. Medlicott, seconded by Captain J. Waterhouse.

Lt.-Col. Minchin, Political Agent, Bháwalpur State, proposed by Mr. M. Macauliffe, Esq., C. S., seconded by Captain J. Waterhouse.

The following gentleman has intimated his desire to withdraw from the Society—

Rev. John Hector, Calcutta.



Letters were read :—

1. From Mr. H. B. Martin, Madhipúra, to Mr. H. Blochmann, regarding Buddhist Shrines—

“There are only two shrines in the Sub-Division which are known to have been made by Buddhists and no other, one is “Jamra Chandithán,” or Baróntpur, from which I sent the inscription, and “Rahta Chandithán” or, Bhawánipúr Rahta, about 25 miles apart; the latter has no inscription as far as one can learn.

2. From the Government of Bengal, forwarding for the information of the Society, the following report from Mr. Pratt, Joint-Magistrate of Maimansingh, on the recent destructive storm in the neighbourhood of Ishwarganj police station.

*Extract of a letter from MR. PRATT, Joint-Magistrate, to the Magistrate of Mymensingh, No. X, dated 6th April, 1875.*

Para. 1.—I have the honor to furnish the required report regarding the recent destructive storm in the neighbourhood of Ishwargunge police station.

2. I visited the scene on the 31st ultimo, and rode along the route which was taken by the storm. The direction was from north-west to south-east, beginning at Betandar and taking the following villages in succession :—Sálnákándá, Deopará, Bashbág, Danibiri, Chota Tárákándi, Bará Tárákándi, Káláliá, Bagárita (including the hamlet of Noapara), Boeráti, Bisunpur, Káláandar, Kullá, Khalbowlá, Moheshpur, Sarsha, Pánán, and Moheshátal.

3. Judging from the accounts given by the villagers, as well as the manner in which the trees had fallen (most lying to the south-east and the rest in all kinds of directions), it would appear that the storm was ushered in by a furious blast from north-west to south-east, which, after a few minutes, veered round from north to south, and, whirling round, at length passed on to the next village to the south-east. The havoc was done over an area of only about half a mile in breadth and extending to 5 or 6 miles in length, so that the storm-current could not have been one huge whirlwind, but rather a succession of smaller gyrations of air.

4. The real fury of the storm lasted only about a quarter of an hour, and it seems to have expended itself at Moheshátal in pergunnah Nusirujeal. Everything fell before the blast, a clean sweep being made of all the houses within the line, and thus it happened that while half a village remained intact, the other half was razed to the ground.

3. From the Secretary to the Government of Bengal (Financial Department) forwarding the following correspondence regarding samples of dye stuffs of Indian growth and of tusser and other silks, and enquiring whether the Society can favour the Government with the information called for.



No.  $\frac{1}{23}$ , dated Simla, the 3rd May, 1875.

*From A. O. HUME, ESQ. C.B., Secretary to the Government of India, Department of Revenue, Agriculture, and Commerce.*

*To the Secretary to the Government of Bengal.*

I am directed to forward herewith copy of a despatch from the Secretary of State, No. 14, dated the 11th March, 1875, and of its enclosures, and to request that, with the permission of His Honor the Lieutenant-Governor, the necessary instructions may be issued for the collection of information on the various kinds of dye-stuffs of Indian growth and production, and specimens of working samples of dye-stuffs, as well as of the tusser and other wild silks.

2. I am to request that the information regarding dye-stuffs may be submitted in as complete a shape as possible, and that the samples may be carefully labelled, and full particulars supplied in regard to them.

3. I am to draw special attention to paragraph 4 of the despatch, relative to the manner in which the tusser silk, which is intended for the markets in Europe, should be reeled.

No. 14, dated India Office, London, the 11th March, 1875.

*From Her Majesty's Secretary of State for India,*

*To the Government of India.*

With reference to my despatch dated 23rd December (No. 69) 1874, I now transmit copy of a letter\* from Mr. Wardle, a silk dyer of great experience, and of one from Mr. Cobb, lately Honorary Secretary of the Silk Supply Association, on the subject of reeling and dyeing the tusser silk.

2. Mr. Wardle has discovered a way of dyeing tusser silk in brilliant colors and of giving it the lustre of Chinese silk; and he is willing to devote a portion of his time to continuing his experiments, and also to teach his process to natives of India.

3. I consider that advantage should be taken of this opportunity of improving a native product, the yield of which is stated to be practically inexhaustible, for Mr. Wardle thinks that the *moogah* and other wild silks are equally capable of improvement. With this object, I would suggest to your Excellency's Government that steps be taken to collect information on the various dye-stuffs of Indian growth and production, and that working samples of dye-stuffs as well as of the tusser and other wild silks, be collected and forwarded to this office in order that Mr. Wardle may be in a position to continue his experiments.

4. The recommendation of Mr. Cobb that the tusser silk should be reeled in skeins, instead of in hanks as at present, is of great practical

\* Dated 1st February, 1875.



importance, and should be made known as widely as possible among those engaged in its production for the markets of Europe.

5. No replies have yet been received from Her Majesty's Consuls at Genoa, Lyons, Marseilles, and in Switzerland respecting the processes of reeling and dyeing silks, but I hope, at an early date, to be enabled to communicate them to your Excellency's Government.

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*Dyeing and Reeling Wild Silks.*

*From THOMAS WARDLE, ESQ., F.G.S.,*

*To Her Majesty's Secretary of State for India.*

I duly received your Lordship's communication requesting me to report on the successful modes of dyeing the wild silks of India.

I have for several years been engaged in endeavouring to overcome the difficulties which, until recently, have surrounded the dyeing of these silks, and more particularly that of the tusser worm.

I think the natives of India may be taught to dye the silk.

They would require some acquaintance with our English chemical methods, which create and regulate affinities for the various tinctorial matters produced in their own and other countries, as well as with the particular processes I have found to succeed, and there would also be necessary the proper appliances for both dyeing and giving a lustre to this silk.

The processes which I have found successful are twofold: those which apply artificial colouring matter, and those in which some Indian or other exotic dye-stuffs are used.

India possesses a large number of dye-stuffs, many of which are practically unknown to English dyers, no doubt mainly owing to the absence of any descriptive work on the subject and the inaccessibility of the information to be derived from the Indian Museum.

Of the former, which are exclusively of English and Continental origin, chiefly derivations of coal-tar, I should give but a reserved recommendation. Their wholesale introduction into India would be almost sure to lower the high standard of Indian taste and decorative art power, and would probably counteract the demand which is rapidly rising at home for eastern dyed products. This much, however, may be said for these artificial dyes, that, owing to the natural brownness of colour of the tusser and other wild silks (which cannot at present be removed), much of the vulgar brightness of these dyes becomes neutralised when applied to these silks, and lower-toned and warmer shades are the result.

It is the application of the native dye-stuffs to the native silks that I would recommend. Besides the manifest economic advantages, there would be others of more importance from an artistic point of view.



To carry out this idea it would be necessary to know what dye-stuffs India produces, and then to investigate their nature and properties, with a view to their application to silk dyeing, and even to silk printing.

I may here be permitted to mention what I have long considered to be a national want, that of our not possessing a national dye-house, under able supervision, where such industrial applications as these could be systematically investigated and developed. France, in her Gobelins dye-house, under the scientific control of so eminent a man as M. Chevreul, possesses great advantages over us in maintaining superiority and supremacy in the silk trade; and yet in the possession of India, probably the largest dye-stuffs producing country in the world, we possess a natural superiority over all other countries, which it is only necessary we should duly cultivate to distance all competition.

The number of Indian dye-stuffs with which I am practically acquainted, such as indigo, madder, safflower, catechu, cochineal, and a few others, constitute only a small portion of those which India produces, and which, I think, might be very advantageously applied on the spot, if they were only made known here and their properties practically investigated.

Besides the meretricious results most of the anilin colors give, they have not the important merit of permanence. In both these respects, I think they would have to yield to native Indian dye-stuffs.

In addition to the silk of the tusser worm, there are others of a still wilder nature, such as some of those exhibited in the vertical cases in the Indian Museum, the names of which I at present forget. I have often thought these might be used in trade to the full extent of their production in textile fabrics, with and without cotton warps, and dyed or printed, or both, perhaps for coarse sewing silk, for cords, and for paper. That which would not admit of being reeled could be carded and spun into threads for weaving, as is the case now to such a large extent in Switzerland, and more lately in England, with the waste silk from the European silk manufacturers and from imported pierced cocoons.

I send samples of rough silk cloth, dyed and undyed, to illustrate my meaning. The silk of these fabrics is entirely from the mulberry worm, and takes the dye easily; it appears to be composed of the worst refuse of silk, almost the shoddy of "silk waste," after the more workable and regular portions have been separated for finer textile work. I think all the wild silks might and ought to be used similarly, if they can only be dyed or printed.

I also send a series of patterns of various dyes on tusser silk of a very inferior quality.

They may serve to point out what can be done in this direction.

If your Lordship is of opinion that I can aid in developing the new



and profitable industry to which your Lordship refers, I shall be glad to place my services at your Lordship's disposal, and would devote a portion of my time to the subject in the direction I have suggested.

For that purpose I should require as much information as is known to the authorities of the India Museum on the various dye-stuffs of Indian growth and production, with working samples of them, and also samples of the tusser and other wild silks, which I could have thrown and spun suitably for dyeing experiments.

I would endeavour to apply these dyes to the silks, and be prepared to teach the natives of India how to use them practically, as well as any or all those I at present understand.

I have derived very useful information from the Indian Museum on several occasions, and I take this opportunity of mentioning that its inaccessibility has prevented my using it as much as I should have done, and also prevents the public at large from almost knowing what a useful and instructive collection is there stowed away.

If it were placed in a more accessible situation, and amplified with a larger assortment of Indian products, the benefit to the trade of India would be greatly increased, and it would have a corresponding influence in elevating English taste and in helping English manufacturers to keep their old proper place in the world in the growing competition with other nations.

This is a matter demanding the attention of the highest statesmanship, particularly in regard to silk manufacture, which has, I am sorry to say, been on the gradual decline in this country for several years.

Dated London, the 1st February 1875.

*From B. FRANCIS COBB, Esq.,*

*To the Under-Secretary of State for India.*

In accordance with the request contained in your favour of 23rd December, I have placed myself in communication with some of the first dyers of silk in England and France with a view of furnishing you with the methods adopted in dyeing the tusser silk of India.

I regret to say the information I have to convey is very meagre for the following reasons :—

In the first place, the prevailing fashion is for the silk in its natural colour ; secondly, the only dyes tried have been useful browns and whites ; and, lastly, the general opinion in this country is that we cannot compete with the natives of India in the dyeing of tussers, especially in bright colours.

A more profitable industry would be to teach the natives to *reel* the tussers ; for once imported into this country in the form of skeins, there



would be a market for any quantity. At present it is reeled in the form of small hanks, either upon a woman's knee or a rude conical hand-reel made of bamboo. The cocoons require to be steeped in more or less strong solutions of potash or caustic soda to dissolve the peculiar gum this insect secretes while spinning.

The different tusser cocoons are produced in such abundance in different parts of India from the sub-Himalayan slopes to Ceylon, in which latter place Sir Emerson Tennant, in his "Natural History of Ceylon," describes no less than three descriptions of tussers of useful qualities, which have since been traced through the whole extent of the Nilghiris, again in the Assam districts, and again in Kangra.

No.  $\frac{2}{18}$ , dated Simla, the 25th May, 1875.

*From A. O. HUME, Esq., C.B., Secretary to the Govt. of India, Department of Revenue, Agriculture and Commerce.*

*To the Secretary to the Government of Bengal.*

In continuation of Circular No.  $\frac{1}{18}$ , dated the 3rd instant, asking that steps may be taken for the collection of information concerning dye-stuffs of Indian production, I am desirous to request that particular attention may be paid to the collection, so far as may be practicable, of facts under the following heads:—

(1) Scientific and local vernacular names of the dye-stuffs produced in the province.

(2) Average approximate extent of cultivation annually in each district for the last five years.

(3) Cost and profits of cultivation.

(4) Season and methods of cultivation.

(5) Average estimated quantity of the dyes produced during the last five years.

(6) Proportion of the quantity produced which is absorbed locally and which is placed on the market. What are the principal markets to which the dyes are forwarded?

(7) Methods locally employed for extraction of the dye.

(8) Uses for which each dye is commonly locally employed, (viz. nature of fabric) and processes of application generally practised. Under this head should be given a full account of the mordants locally employed, and it should be stated what shades of colours are produced, by what combinations, and whether the colours are permanent or fleeting.

(9) Average price of each merchantable dye-stuff, according to quality, in the market.

(10) Total annual trade in each kind, stating the countries of import and export.



(11) To what extent is European capital employed in the production and manufacture of dyes, indigo and other.

2. In regard to dye-stuffs collected from forest trees, it is desirable that the Forest Department should supply the fullest particulars available.

3. His Excellency in Council also requests that attention may be directed to the subject of the competition of anilin dyes with dyes of local production. It should be stated how far this competition has been successful, what are the prospects of Indian dyes in Bengal, and whether any measures seem to be required for the encouragement of this branch of industry.

4. I am further to request that the fullest information available on the subject of tans of Indian production may also be furnished.

With reference to the above, the Council will be obliged if members of the Society possessing information on the subjects noted, will kindly communicate it for submission to the Bengal Government.

The President announced that as it had been found that advantage was not taken of the Library being open on Friday mornings, the practice would be discontinued as it caused extra expense.

Also that Dr. G. Thibaut, Anglo-Sanskrit Professor, Benares College, had been appointed a member of the Philological Committee.

Mr. W. T. Blanford exhibited some specimens of flint-cores and flakes from Sakhar and Rohri on the Indus, Sind, and gave the following account of them :—

Many years ago my attention was attracted to some very beautiful specimens of flint-cores from Sind in the collections belonging to the Bombay Branch of the Royal Asiatic Society. I subsequently often heard of similar worked flints being found in Sind. In the *Geological Magazine* for 1866, Plate XVI., three of these cores were very well figured from specimens procured by Lieut. Twemlow of the Royal Engineers and described (p. 433) by Mr. John Evans, who called attention to their beautiful regularity of form, and was inclined to ascribe them rather to the "neolithic" than to the "palæolithic" age. He compared them to the implements found by Messrs. Foote and King in the laterite beds of Southern India, and suggested that the material might prove to be rather a quartzite than a flint and consequently more thoroughly homogeneous than the chalk flints, for instance, from which implements were largely made in Western Europe. This however is a mistake caused naturally by the want on the specimens examined by Mr. Evans of any fracture sufficiently fresh to shew the texture. The Southern Indian implements are, so far as I have seen, generally of quartzite, and I have even met with a few of vein quartz, the Sind cores and flakes are of flint from the nummulitic limestone.



The most remarkable point about the cores found by Lieut. Twemlow was that they were stated to have been obtained three feet below the rock in the bed of the river. In a subsequent letter, (Geol. Mag. 1867, p. 43,) General Twemlow gave a section of the locality and explained that the specimens sent were from "a mass of flints, packed together, in layers of from one and a half to two feet in thickness," resting on limestone which proved to be true nummulitic limestone, full of *N. lævigata*, and covered by a recent silt deposit. Although this renders the matter rather simpler, because the cores were found above and not beneath the limestone, still the circumstance of their being found in the mass of flints is not clear. I may add that after examining the spot I have found the flints to be in place in the limestone, in which they occur as nodules, often of very large size, and forming in some cases imperfect and irregular bands in the strata, just as they do in the chalk of England.

I had occasion to visit Sakhar in the month of April last, and I naturally made enquiries about the cores occurring there. I then learned, chiefly from Mr. John Tate, C. E., that cores had been recently found both in the Indus Channel and on the hills around Rohri.

For the three cores now exhibited I am indebted to Mr. Tate, who was in charge of some rock excavations for the purpose of preventing the accumulation of silt at the mouth of the Sakhar canal. For this purpose a channel had to be cut in the limestone of which the river bank is composed at Sakhar, and in this limestone I am assured that the cores were found; and that in one case, at least, one was picked up immediately after some rock had been blasted, at a depth of at least two or three feet from the original surface of the limestone.

The rock, as already mentioned, is nummulitic limestone and unmistakeably of Eocene age. But an examination of this limestone shews that it is intersected in every direction by holes and crevices, many of them of considerable size, and there can, I think, be very little doubt that the cores have been derived from these crevices, which are usually filled with a mixture of gypsum and clay. Whether the worked flints have fallen into the crevices, or been washed in by the river, it is impossible to say; the cracks in question are for the most part horizontal or nearly so, but the cores are in no case that I have seen rounded, as if they had been transported for any distance by river action.

There can be very little doubt about the late age of these cores. They are by far the most carefully formed of any hitherto found in India, and are so far superior to all ordinary forms made of the same material, that, as was pointed out by Mr. Evans in the Geological Magazine, they rather resemble those of Obsidian which are found in Mexico and in some other places. The material of which they are formed is doubtless the flint which



abounds in the limestone of Rohri, and precisely resembles in form and mode of occurrence the flint of the English chalk.

On the hills around Rohri and Sakhar, cores and the flakes chipped from them abound in places, but all which I have seen are much more rudely formed than those obtained from the channel of the river Indus. A number are exhibited. Mr. Fedden noticed a peculiarity in many of the cores, which I do not recollect having seen before; this is that several of them, at the base, present the appearance of a flat surface ground by artificial means. The material is in all cases the nummulitic flint.

I am much disposed to believe that the cores found in the Indus were made by a different people from those who chipped their flakes on the hills around. This may be due to the more civilized flake-makers having established themselves on the river bank, whilst their less expert contemporaries roamed amongst the neighbouring hills or visited them for the purpose of obtaining a stock of cutting implements; or the former may have lived later, when the art of flint-chipping had been brought to greater perfection. There is a possibility that the best flints were selected and carried home to the dwellings on the bank of the river, in order that cutting flakes might be obtained from them by pressure, whilst less perfect materials were utilized and thrown away at once. However it may have happened, it is certain that all the specimens I have yet seen from the river bed are singularly well formed, shewing as a rule no trace of a flaw, and Mr. Tate informs me that, of a considerable number which he had seen, all were equally well fashioned, and although an occasional well shaped core may be found on the hills, the majority are broken or imperfect.

The President remarked that two or three of the specimens exhibited were the best samples of flint instruments he had ever seen.

Mr. Ball exhibited two specimens of Indian Boomerangs or throwing sticks, and made the following remarks regarding them:—

The objects exhibited and which, for want of another name, I call Boomerangs were received by me from Mr. H. P. LeMesurier of Bombay. On examination it appeared to me that they were different from my recollection of the Australian Boomerang, and I failed to make them shew any sign when thrown of its peculiar and well known property; though in throwing them I followed the instructions of a friend who had seen the true Boomerang used by Australians.

On writing to Mr. LeMesurier for further information he replied that they came from Kattyawar and added—"They are used about Patri and Wudwan, B. B., and Cl. I. R. I can't make them come back. Possibly the original makers of all Boomerangs found out as the Kattyawar folks



did that the shape was a handy one to shy, and only found out by accident afterwards that by some dodge in shaping they could be made to return."

Until yesterday I supposed that the use of such a weapon had not hitherto been recorded from any part of India, but on reading a paper on the Australian aborigines, in the *Journal of the Anthropological Institute*,\* I found that several of the members, including Sir John Lubbock and Col. Lane Fox, who took part in the discussion which followed the reading of the paper, were aware of a weapon similar in shape being used by some of the Hill-tribes of India who, however, used it to throw *directly* at an object, its principle being, therefore, different from that of the true Australian Boomerangs.†

The fact of the possession of such a weapon by certain Indian tribes was noted by the speakers as being interesting in connection with the view held by Professor Huxley on physical grounds as to a relation existing between Australians, Dravidians and Ancient Egyptians.‡ This view it would seem is also in some degree supported by philological considerations.

The best formed of these throwing sticks now in my possession is about 3 inches deep at the curve. One of the arms, is 15 inches long and the other 14½ inches. The angle included between the two arms is about 140°. The material is Babul (*Acacia arabica*). The other specimens are of different woods and of somewhat different shape, but are less highly finished and moreover cannot be thrown with the same degree of accuracy.

The following papers were read :—

1. *Pāli Studies*.—By MAJOR G. E. FRYER, *Deputy Commissioner, British Burma*. No. I. *On the Ceylon Grammarian Saṅgharakkhita Thera and his Treatise on Rhetoric*.

(Abstract.)

It was the practice amongst members of the early Buddhist church when entering the priesthood to discard their patronymic, and to adopt a priestly title, under which it was not always easy to recognize their identity. Thus it was with Saṅgharakkhita Thera, of whom nothing was known, except that he wrote the 'Vuttodaya' a brief treatise on Pāli prosody.

\* Vol. I, No. 1, 1871, p. 104.

† The use of these implements is thus alluded to by Lt.-Col. Gordon-Cumming. Many of these men (Guzerat Kolis) carried boomerangs, a weapon I have never seen used in any other part of India. It was made of a dark heavy wood two inches broad three quarters of an inch thick and about two and a half feet long sharpened at the edges. These they threw with great force and would not unfrequently knock over hares and partridges as they rose during the beat." *Wild Men and Wild Beasts*, p. 96.

‡ A similar weapon is said to be figured on some ancient Egyptian monuments.



apparent order of the ascending section must be the normal (original) order of superposition; whereby the partially metamorphosed Damuda rocks at the base are really older than the overlying Daling schists, and these again older than the Darjiling gneiss. Mr. Medicott remarked—that Mr. Mallet's description of a number of carefully observed river sections at the base of the Sikkim Himalaya seemed to compel to this conclusion; and that analogous sections in the N. W. Himalaya, had frequently suggested to himself similar conclusions: for instance, there can be no doubt that the thoroughly metamorphic mica, hornblende and garnetiferous schists forming the summit of the ridge at Simla are younger than the underlying slaty schists and flags. Again, the generally unmetamorphosed limestone and slaty rocks striking far up the gorges of the Sutlej and the Beas seem inevitably to underlie the gneiss of the intervening Jalori ridge. The argument against the adoption of this view is really a prepossession—a general rule which we are by no means entitled to apply rigorously, and against which independent arguments are not wanting. It has been shown experimentally that the hydro-metamorphism to which gneiss and even granite are due, is not after all such a very plutonic operation. Also, although when we meet gneiss extensively on the flat, we may be entitled to regard it as a fundamental rock—due to such hypogene action as would require every underlying rock to exhibit an equal degree of metamorphism—the conditions were quite different when we come to mountain regions. Here special forces had operated which might be quite adequate to these apparently anomalous results. One of the most recent and most elaborately supported theories of mountain-formation—that by Mr. Robert Mallet—offered a very direct explanation of this puzzling phenomenon: that when a great mass of strata was subjected to lateral compression those portions which by position or from texture were least capable of yielding by shrinkage or contortion, would have to bear the brunt of the pressure, and to undergo in some other form its effects, prominently by an extra development of internal heat.

6. *Note on the Manipúri Language.*—By G. H. DAMANT, C. S., Kachhár.

(Abstract.)

The Manipúri language belongs to the Lohitic languages, and is therefore allied to the languages of the tribes of the Burmese frontier. Mr. Damant has given in this paper paradigms of declensions of nouns and inflections of verbs. Of the written characters of the language, Mr. Damant gave a specimen in the Proceedings for January last.

The paper will be printed in No. II of Part I of the Journal.

7. *Descriptions of a new Subgenus of Cyclophorus, and of other new Land and Freshwater Shells of India and Burmah.*—By W. THEOBALD.

This paper will appear in a forthcoming number of the Journal.



8. *Note on Mahásthán near Bagurá (Bogra), Eastern Bengal*.—By C. J. O'DONNELL, C. S.

(Abstract.)

The author has collected in this paper the legends which he heard at Mahásthán, a place famous in the earliest Hindú traditions of Eastern India, and also of interest in later times as a Muhammadan shrine of great sanctity. It lies seven miles north of Bagurá, and consists of a great mound of earth intermixed with old bricks. Branching out from it, north and west, are two great ramparts, which are continued round to form a quadrangular enclosure. The enclosure is conspicuously marked on Sheet 119 of the Indian Atlas.\* All round it are shrines, holy wells, and embankments connected with the name of Bhím, one of the Pándava brothers. The principal Muhammadan monument is the shrine of Hazrat Sháh Auliá.

The paper will be printed in No. II of Part I of the Journal.

9. *Contributions to the History and Geography of Bengal*. No. III. By H. BLOCHMANN, M. A., *Calcutta Madrasah*.

(Abstract.)

This short paper contains readings of two inscriptions discovered by Mr. E. V. Westmacott, C. S., in Dínájpúr and Sherpúr Murchah, and a description of eight valuable coins belonging to the reign of Mahmúd Sháh I. of Bengal. Four of the latter were also received from Mr. Westmacott, and the other four from Mr. C. J. O'Donnell, C. S. They were all found in Mahásthán, near Bagurá (Bogra). The chronology of the reign of Mahmúd Sháh, which was hitherto one of the most obscure periods of Bengal history, becomes gradually settled, coins and inscriptions having yielded the dates A. H. 846, 852, 858, 861, 862, 863.

Mr. Westmacott's Bárbak Sháh inscription appears to be of 865 A. H. The other inscription gives the name of Ghiyásuddín Abul Muzaffar Jalál Sháh, son of Muhammad Sháh Ghází, and the year 960. The year shews how unsatisfactory the chronology is of the Afghán period of Bengal History.

The paper will be published in No. III of Part I of the Journal.

10. *The Bárah Bhúyáhs of Bengal*. No. II.—By DR. JAMES WISE.

(Abstract.)

This short note is a continuation of Dr. Wise's essay on the Bárah Bhúyáhs, or Twelve Lords, of Bengal, published in last year's Journal (p.

\* Another extraordinary embankment is due south from Sherpúr Murchah (15 miles south of Bagurá). It extends for about 8 miles, when it turns at a right angle to the west for about sixteen miles. It is also marked on Sheet 119 of the Indian Atlas.



197). Dr. Wise has now had an opportunity in England to consult several rare works written in the 17th century, containing confirmatory references to the Bárah Bhúyahs and their position. The works are—R. P. Petri Jarici Thesaurus rerum Indicarum, Col. Agrippinæ, 1615; La Monde ou Description générale de ses quatres parties, by Pierre D'Avity, Seigneur de Montmartin, Paris, 1643, fol.; Itinerario de las Misiones que hizo el Padri F. Sébastien Maurique, Rome, 1649; and Dell' India Orientale, descrittione geografica et historica, del P. Abbate D. Clemente Tosi, Rome, 1669.

This paper will also be published in No. II, Part I of the Journal.

The reading of the following papers was postponed—

Observations on some Indian and Burmese species of *Trionyx*, with descriptions of two new species.—By W. Theobald.

Supposed Greek Sculpture at Mathura.—By F. S. Growse, C. S.

*Abstract of the Proceedings of the Committees appointed by the Councils of the Asiatic and Agri-Horticultural Societies for the consideration and furtherance of Mr. Schwendler's proposition for the establishment of a Zoological Garden in Calcutta.*

In 1867 Dr. Fayer drew the attention of the Society to the want of a Zoological Garden in Calcutta.

In 1873 Mr. Schwendler again brought the subject before a Special Meeting of the Council and Natural History Committee, held on the 15th March.

Mr. Schwendler's proposals were :—

1. That the capital for starting should be raised by *donations*.
2. That the annual expenses should be defrayed by—
  - I. An Annual Grant from Government.
  - II. From the Municipality of Calcutta, and
  - III. Entrance fees.
  - IV. Funds raised by establishing a Zoological Garden Society.
  - V. Profits on an Import and Export trade in animals.

3. That the most suitable site would be the unoccupied ground round the Kidderpore School, on the north side of Tolly's Nullah, between the Alipore and Kidderpore Bridges.

The meeting recorded their opinion of the advantage that would result from the establishment of a Zoological Garden in Calcutta and appointed a Sub-Committee, to consider and report on the feasibility of Mr. Schwendler's or any other scheme which might promise a successful result. The members of the Sub-Committee were :



The Hon. Sir R. Couch.

„ E. C. Bayley, C. S. I.

Babu Devendra Mullick.

„ Rajendralala Mitra.

Dr. J. Ewart.

Dr. J. Anderson.

Col. Hyde, R. E.

Dr. Dobson.

Mr. L. Schwendler.

Captain Waterhouse.

On the invitation of the Sub-Committee, Mr. J. A. Crawford, President of the Agri-Horticultural Society, also joined the Sub-Committee.

The Sub-Committee reported that, with some modifications, Mr. Schwendler's scheme appeared feasible. They considered that the capital required, could best be raised by public subscriptions and recommended that a deputation should wait on His Honor the Lieutenant-Governor of Bengal to lay the scheme before him and ascertain the amount of support the Government of Bengal might be disposed to give to the project: they further recommended that after the views of the Lieutenant-Governor had been ascertained, a prospectus, with a subscription list, should be circulated to the public.

With regard to the permanent income, the Sub-Committee were of opinion that the current expenses might be met by grants from the Imperial and Local Governments, the Town and Suburban Municipalities, the Asiatic and Agri-Horticultural Societies. The income from the above sources was roughly estimated at Rs. 14,000. From entrance fees it was estimated the income might be Rs. 17,750, or more. From the formation of a Zoological Garden Society Rs. 9,100. Total income Rs. 40,850.

The Sub-Committee recognised the value of Mr. Schwendler's proposal for forming an Agency for the sale and exchange of animals, as another possible source of income. They also stated that the site of the proposed garden should be somewhere in the vicinity of the Circular Road between Sealdah and Park Street, and recommended that an endeavour should be made to obtain a grant from Government of the building and plot of ground now occupied by the Pauper Hospital which, it was understood at the time, would be given up.

In conclusion, the Sub-Committee reported that His Excellency the Viceroy had expressed his readiness to take into consideration the question of transferring the collection of animals from the Barrackpore Park to the new garden, if successfully established; that Babu Rajendra Mullick had renewed his offer of a donation of Rs. 2000 towards the funds, besides gifts of animals from his own collections: and further that the Maharajah of



Vizianagram had expressed his readiness to subscribe and assist as a member of the General Committee when formed.

At a meeting of the Sub-Committee held on the 19th March, it was resolved that letters should be addressed to the Chairman of the Justices of the Peace for the Town of Calcutta and of the Suburban Municipality to ascertain whether they would be prepared to grant a sum, not exceeding Rs. 200 per mensem, for the maintenance of a Zoological Garden ; and that a letter should be addressed to the Maharajah of Burdwan enquiring whether he was willing to renew his promise, made in 1867, of a donation of Rs. 30,000.

In reply, the Secretary to the Justices wrote, that after full consideration of the application they had resolved—That though they could not comply, they were prepared to consider the question of establishing a People's Park on a scheme being placed before them which they could legally support. The Vice-Chairman of the Suburban Municipality replied, that he was not in a position to promise support ; and His Highness the Maharajah of Burdwan answered that though not sanguine of success, he would be glad to assist, should there be a fair chance of establishing the garden.

The Report of the Sub-Committee was submitted to the Council of the Asiatic Society at their meeting on the 27th March, and it was ordered to be printed and circulated for the information of the Council. It was also resolved, on the proposal of Col. Gastrell, that a copy of the Report should be sent to the Council of the Agri-Horticultural Society.

A meeting of the Councils of the two Societies was held on the 9th April, when part of the Report of the Sub-Committee was read, and it was resolved :—

1st.—That the scheme for forming a Zoological Garden is deserving of the utmost support, and in the opinion of the meeting, the site proposed by the Sub-Committee is the best that has been presented to their notice.

2nd.—That a deputation of

The Hon. Sir R. Couch, Kt.

The Hon. E. C. Bayley, C. S. I.

The Hon. Louis Jackson.

The President of the Asiatic Society.

„ Agri-Horticultural Society.

„ British Indian Association.

Babu Rajendralala Mitra.

L. Schwendler, Esq.

Dr. J. Anderson.

Capt. Waterhouse.

should wait on His Honor the Lieutenant-Governor of Bengal to place the scheme before him and to solicit the assistance of the Government of Bengal.



3rd.—That the Government of India, the Government of Bengal, the Municipality of the Town of Calcutta, the Suburban Municipality, the Asiatic and the Agri-Horticultural Societies be addressed and solicited to assist.

It was afterwards proposed that Mr. H. A. Cockerell, officiating Chairman of the Justices and the Hon. Sir R. Temple should be invited to join the deputation.

A deputation of the above named members and Dr. Stoliczka, (with the exception of Sir R. Temple), were favoured with an interview with the Lieut.-Governor on the 16th April. Sir R. Couch briefly explained the object of the deputation. The Lieut.-Governor, in reply, expressed his readiness to aid the scheme for a People's Park, provided he saw his way to its successful realization; but stated that it was very difficult to find a suitable site, ground near Calcutta being very scarce and dear. He declined to entertain any proposal to remove the Pauper and other Hospitals. Further he said that the surrender of the Kidderpore site depended on the surrender of the Orphan Asylum ground by the Military authorities, who did not appear to have been asked. He added that if that site could be obtained, he would perhaps be able to add a very little of the adjoining Government land.

There appearing no chance of obtaining the site of the Pauper Hospital, it became necessary to consider whether any other site could be found, and as it had been proposed at the meeting of the Justices that the large piece of ground in the northern part of the town, known as Rajah Bagan, should be laid out as a People's Park and that a portion of it should be made over to the Councils of the Asiatic and Agri-Horticultural Societies to form a Zoological Garden, Mr. Cockerell undertook to ascertain the cost of acquiring and laying out this piece of ground and wrote on the 29th April, that it would cost Rs. 12,000 to surround it with a wall 10 feet high and Rs. 20,000 to remove existing huts. As regards the laying out of the Park, he said it was difficult to form an exact estimate, but to lay out 200 beegahs of ground in the simplest manner would cost not less than Rs. 15,000. The first expenditure would therefore be, say Rs. 50,000; the ground rent would probably be Rs. 10,000 per annum and the expenses of malees, &c. say Rs. 200 a month. These estimates did not include the expenses of maintaining the zoological collection.

A special general meeting of the Councils of both Societies, the other members of the deputation and the Sub-Committee was held on the 8th May, to consider what further steps could be taken to advance the project and it was resolved :—



"That a meeting be convened at the Town Hall, to ascertain the public feeling on the subject and with a view to the formation of a large and influential Committee for the promotion of the scheme."

The meeting was ordered to be held on the 14th May, and it was resolved that Sir R. Couch should be asked to take the chair.

Sir R. Couch having expressed his unwillingness to preside at a public meeting, and it also being considered desirable to postpone the meeting till Mr. Cockerell could ascertain the terms on which the ground could be acquired, the meeting was not held on the day appointed.

On the 3rd June, Mr. Cockerell wrote that he had received the consent of the Sobha Bazar zemindars to give a permanent lease of Rajah Bagan, and that he had also ascertained from the Receiver of the High Court that there was no objection to the lease on his part. He stated that he proposed to lay the matter before the Justices, as soon as the Government subscription would be ascertained, and that he had hopes they would consent to pay the rent and taxes of the land, amounting to something over Rs. 11,000 a year. Further Mr. Cockerell expressed as his opinion that a public meeting at that time of the year would hardly answer, and that it might be as well to ascertain the measure of assistance to be looked for from Government before appealing to the public.

This letter was circulated to the members of the different Committees and the public meeting was postponed pending the receipt of further information. Mr. Cockerell has since been relieved of the duties of officiating Chairman of the Justices and nothing further appears to have been done by the Justices nor could much assistance have been expected from them for some time to come.

Sir Richard Temple has however determined on taking up the land lying on both sides of the road leading into Belvidere for this purpose and endeavours are being made for the Garden being ready in time to be opened by the Prince of Wales.\*

\* The above abstract has been prepared by Mr. J. O'Kinealy C. S. from the report drawn up by Capt. Waterhouse as Secretary to the Committees and is published by order of the Council for the information of Members. Ed.



## LIBRARY.

The following additions have been made to the Library since the meeting held in June last.

*Presentations.*

\*.\* Names of donors in capitals.

Proceedings of the Royal Geographical Society. Vol. XIX, Nos. I to III, 1875.

No. II. *Warren*.—On the Reconnaissance of a New or partially known Country.

No. III. *Oxenham*.—The Inundations of the Yang-Tsze-Kiang.

ROYAL GEOGRAPHICAL SOCIETY OF LONDON.

Minutes of Proceedings of the Institution of Civil Engineers. Vol. XXXIX., P. I., 1874-75.

*A. R. Binnie*.—The Nágpur Waterworks; with observations on the Rainfall, the Flow from the ground, and Evaporation at Nagpur, and on the Fluctuation of Rainfall in India and in other places. *C. Stone*. The Implements employed, and the Stone Protection adopted in the Reconstruction of the Bridges on the Delhi Railway.

INSTITUTION OF CIVIL ENGINEERS, LONDON.

Institution of Mechanical Engineers Proceedings for August and October, 1874.

INSTITUTION OF MECHANICAL ENGINEERS, BIRMINGHAM.

Journal of the Statistical Society. Vol. 38, p. I., 1875.

*H. Jeula*.—The Mercantile Navies of the World in the years 1870 and 1874 compared.

STATISTICAL SOCIETY, LONDON.

Proceedings of the Royal Society. Vol. XXIII., Nos. 159 and 160.

No. 159. *W. B. Carpenter*.—Remarks on Professor Wyville Thomson's preliminary Notes on the Nature of the Sea-bottom, procured by the Soundings of H. M. S. "Challenger." *Prof. W. Thomson*. Report to the Hydrographer of the Admiralty on the cruise of H. M. S. "Challenger" from July to November, 1874. *J. B. N. Hennessey*. Some particulars of the Transit of Venus across the Sun, December 9th, 1874, observed on the Himalaya Mountains, at Mussoorie. Note No. 1. *J. B. N. Hennessey*. Appendix to note, dated November 1873, on White Lines in the Solar Spectrum. *T. Lauder Brunton and J. Fayer*.—On the Nature and Physiological Action of the *Crotalus*-poison as compared with that of *Naja tripudians* and other Indian Venomous Snakes; also Investigations into the Nature of the Influence of *Naja* and *Crotalus*-Poison on Ciliary and Amœboid Action, and on Vallisneria, and on the influence of Inspiration of Pure Oxygen on Poisoned Animals. *Prof. W. G. Adams*. On the forms of Equipotential Curves and Surfaces and Lines of Electric Force.

No. 160. *J. G. Buchanan*. On the Determination at Sea of the Specific Gravity of Sea-Water. *Capt. W. J. Heaviside, R. E.* Preliminary Abstract of Approximate Mean Results with the Invariable Pendulums Nos. 4 and 1841, in continuation of the Abstract published in Vol. XIX. of the Proceedings. *J. N. Lockyer and W. C. Roberts*.—



On the Absorption-Spectra of Metals volatilized by the Oxyhydrogen Flame. *W. C. Roberts*. On the Liquefaction, Fusibility, and Density of certain Alloys of Silver and Copper. *Rev. A. E. Eaton*. First Report of the Naturalist attached to the Transit-of-Venus expedition to Kerguelen's Island. December, 1874.

ROYAL SOCIETY, LONDON.

Memoirs of the Royal Astronomical Society. Vol. 40, 1874-75.

A Catalogue of 10,300 Multiple and Double Stars arranged in the Order of Right Ascension.

ROYAL ASTRONOMICAL SOCIETY, LONDON.

Bulletin de la Société d'Anthropologie de Paris. Vols. 9 and 10 Fas. 4, 1874, and Fas. 1, 1875.

Fas. 4, 1874. *M. D'Abbadie*.—Discussion sur les instructions pour l'Asie Centrale.

Fas. 1, 1875. *Hamy*. La famille velue de Birmanie. *Mondières*. Renseignements ethnographiques sur la Cochinchine. *Morice*. Sur l'anthropologie de l'Indo-Chine.

ANTHROPOLOGICAL SOCIETY OF PARIS.

Bulletin de la Société de Géographie, April, 1875.

GEOGRAPHICAL SOCIETY OF PARIS.

Records of the Geological Survey of India. Vol. VIII., P. 2, 1875.

*W. King*.—Preliminary note on the Gold-fields of South-east Wynad, Madras Presidency. *A. B. Wynne*. Geological notes on the Kharisian Hills in the Upper Panjab. *W. T. Blanford*. Report on Water-bearing strata of the Surat District. *H. B. Medlicott*. Sketch of the Geology of Scindia's territories.

Memoirs of the Geological Survey of India. Palæontologia Indica. Vols. 1, 3, 1875. Jurassic Fauna of Kutch, by Dr. W. Waagen.

SUPERINTENDENT GEOLOGICAL SURVEY.

Monatsbericht der Königlich Preussischen Akademie der Wissenschaften zu Berlin. Februar and März, 1875.

ROYAL PRUSSIAN ACADEMY OF SCIENCES, BERLIN.

Minutes of the Annual General Meeting of the Trustees of the Indian Museum for the year 1874-75.

THE TRUSTEES OF THE INDIAN MUSEUM.

Verhandlungen der K. K. Zoologisch—Botanischen Gesellschaft in Wien. Vol. XXIV. 1874.

*Reichardt, H. W.*—Präparierte *Porphyra vulgaris* Ag. aus Japan. *E. Reitter*. Beitrag zur Kenntniss der Japanesischen *Cryptophagiden*. *Dybowski, Dr. B.* Die Fische des Baical Wassersystemes.

ZOOLOGICAL AND BOTANICAL SOCIETY OF VIENNA.

Oesterreichische Monatsschrift für den Orient. Nos. 5 and 6, 1875.

ORIENTAL MUSEUM OF VIENNA.



Sitzungsberichte der K. C. Akademie der Wissenschafte zu München. Philosophisch-Philologischen und historischen Classe. Pts. I. III. IV, 1874. Mathematisch Physikalischen Classe, Pt. II., 1874.

Abhandlungen der Philosophisch-Philologischen Classe. 13 vol. Pt. 2, 1874.

Abhandlungen der Mathematisch-Physikalischen Classe. 11 vol. Pt. 3, 1874.

ROYAL BAVARIAN ACADEMY OF SCIENCES, MUNICH.

Conference on Urdu and Hindi Christian Literature held at Allahabad, 1875.

SECRETARY TO THE CONFERENCE.

Jahrbuch der K. Königlichen Geologischen Reichsanstalt. Vol. 24, 1874.

THE IMPERIAL GEOLOGICAL ACADEMY OF VIENNA.

Leopoldina, Pts. 7, 8, 9, 1871-73.

LEOPOLDINE CAROLINE GERMAN ACADEMY OF NATURAL PHILOSOPHY,  
DRESDEN.

Report on the Gaols of the Central Provinces for 1874.

Report on the working of the Registration Department in the Central Provinces for 1874-75.

Report, with Chief Commissioner's remarks, on the Stamp Revenue of the Central Provinces, for 1874-75.

CHIEF COMMISSIONER OF THE CENTRAL PROVINCES.

Yajur Veda Sanhita, Pts. 6 and 7.

Report on the Revenue Survey Operations of the Lower Provinces from October 1873 to September 1874.

Rig Veda Sanhita, edited by F. Max Müller. Vol. VI.

GOVERNMENT OF BENGAL.

Statistical Reports of Norway.

Min Haerramek ja Baestamek Jesus Kristus odda Testamenta.

Grundtrøkkene den Ældste Norske Proces, by E. Hertzberg.

Die Aegyptischen Denkmäler in St. Petersburg, Helsingfors, Upsala und Copenhagen, by J. Lieblein.

ROYAL NORWEGIAN UNIVERSITY IN CHRISTIANIA.

Report on the Midnapore and Burdwan Cyclone of the 15th and 16th of October, 1874.

Report of the Meteorological Reporter to the Government of Bengal, 1874.

W. G. WILLSON, Esq.



**Magnetische und Meteorologische Beobachtungen, 1873.**

ROYAL OBSERVATORY OF PRAGUE.

Dirigeur Prof. Abū-l-Walīd Maḥmūd b. al-Walīd al-Anṣārī, by Prof.  
M. J. de Goeje.

EDITOR.

*Purchased.*

Quarterly Journal of Microscopical Science. New Series, Vol. LVIII,  
April, 1875.

Rev. M. J. Berkeley.—On the Thread Effects of Tea. E. Ray Lanister. On the  
Invaginate Plasmale, or Diplodlastic Phase of *Paludina vivipara*.

The Edinburgh Review, No. 253, April, 1875. The Geology of India.

Journal of the Society of Arts. Vol. XXIII, Nos. 1164 to 1172.

No. 1164. Indian Museum.

No. 1166. Tussock Silk-worm. The Cultivation of Opium and Cinchona in India.  
The Roman & the Indian alphabets. Cacao Cultivation in India.

No. 1168. E. H. Elliott.—Measures and Suggestions for the Advancement of the  
Wet and Dry Cultivation in India. The Roman Alphabet for India.

No. 1170. J. Forbes Watson.—The Indian Museum Question. Scientific and Li-  
terary Societies in India.

No. 1171. J. Forbes Watson.—The Preparation and Uses of Rhea Fibre.

No. 1172. E. Helm.—The Growth of the Factory System in India, with especial  
reference to the Production of Textile Fabrics and the relative Advantages of the Bri-  
tish and Indian Manufacturer.

The Westminster Review. New Series, No. XCIV, April, 1875.

IV. Our position in India.

The London, Edinburgh and Dublin Philosophical Magazine and Jour-  
nal of Science. Vol. 49, Nos. 325, 326, April and May, 1875.

No. 325. J. R. Capron.—On the Comparison of some Tube and other Spectra, with  
the Spectrum of the Aurora. C. Tomlinson. On the Action of Solids in Liberating Gas  
from Solution.

No. 326. M. E. Goldstein.—On Spectra of Gases. A. M. Mayer.—Researches in  
Acoustics. Prof. G. C. Foster.—On Graphical Methods of solving certain simple Elec-  
trical Problems. A. F. Weinhold. Introduction to Experimental Physics, Theoretical  
and Practical, including Directions for Constructing Physical Apparatus and for making  
Experiments. W. M. Watts. On the Spectrum of the Aurora. H. J. Peltz. On a  
Lecture-room Apparatus for the Determination of the Mechanical Equivalent of Heat.

The Annals and Magazine of Natural History. Vol. 15. Nos. 88  
and 89, April and May 1875.

No. 88. Rev. O. P. Cambridge.—On a New Species of *Liphistius*, SCHRÖDTER.  
T. Gill. On the Geographical Distribution of Fishes. A. S. Packard, Jun.—On an  
undescribed Organ in *Limulus*, supposed to be Renal in its nature.

No. 89. R. v. Willemoes-Suhm.—Notes on some Young Stages of *Umbellularia*,  
and on its Geographical Distribution. M. Usow.—Zoologico-Embryological Investi-  
gations. J. Wood-Mason.—Note on the Geographical Distribution of the *Temnocephala*



*Chilensis* of BLANCHARD. Dr. Franz Low. *Tylenchus millefolii*, n. sp. a new gall-producing *Anguillulide*. A. M. Mayer. Experiments on the supposed Auditory Apparatus of the *Culex mosquito*. M. A. Schneider.—On an Apparatus of Dissemination of the *Gregarinæ* and the *Stylorhynchi*, and on a remarkable Phase of Sporulation in the latter Genus. Dr. A. B. Meyer. On the Habitat of *Peristethidion prionocephalum* DUM. Dimorphic Development and Alternation of Generations in the *Cladocera*. Action of Light on the Development of the Young of Frogs.

The Quarterly Review. No. 276, April, 1875.

II. Indian Missions, IX. England and Russia in the East.

The American Journal of Science and Arts. Vol. IX. Nos. 50, 51 and 52, 1875.

No. 50. A. E. Verrill.—The Gigantic Cephalopods of the North Atlantic.

No. 52. A. M. Mayer.—The History of Young's Discovery of his Theory of Colors. A Re-determination of the Constants of the Law connecting the Pitch of a Sound with the Duration of its Residual Sensation.

The Academy. Nos. 156 to 161, 1875.

The Quarterly Journal of Science. No. 146, April, 1875.

The Calcutta Review. No. 121, Vol. 71, July, 1875.

Revue Critique d'Histoire et de Litterature. Nos. 1 to 18, 1875.

Nos. 2 and 3. Delbrück.—Chrestomathie védique. Le verbe dans la langue Védique.

No. 5. De Gubernatis. Lectures sur la Mythologie Védique.

No. 10. Coomara Swamy.—Sutta Nipāta.

No. 11. Talboys Wheeler.—Histoire de l'Inde. Hurry Chund Chintamon. Commentaire sur la Bhagavad-Gīta.

No. 12. Hodgson.—Essais Sur les langues la littérature et la religion du Nepal et du Tibet.

No. 15. Max Müller.—Rig-Veda-Sanhitā, t. VI.

No. 16. Kern.—L'Aryabhatīya.

Revue et Magasin de Zoologie. No. 12, 1874. No. 1 and 2, 1875.

Revue Archéologique. Nos. III and IV, March and April, 1875.

Comptes Rendus. Vol. 80. No. 9 to 16, 1875.

No. 10. M. Mouchez.—Observation du passage de Vénus, à l'île Saint-Paul, Phénomènes optiques observés aux environs des contacts.

No. 11. M. Bouquet de la Grye.—Sur les documents scientifiques recueillis à l'île Campbell, par la Mission envoyée pour observer le passage de Vénus. M. José da Silva Mendes-Leal.—Ministre du Portugal, adresse à l'Académie une lettre originale de Manoel Godinho de Herpédia, indiquant la découverte de l'Australie par les Portugais M. Langley. Sur la température relative des diverses régions du Soleil. Première partie: Les noyaux noirs des taches.

No. 12. M. Földes.—De l'essai des étamages contenant du plomb; procédé d'essai rapide. M. Langley.—Sur la température relative des diverses régions du soleil. Deuxième partie. Région équatoriale et régions polaires.

No. 13. M. Andral.—Documents pour servir à l'histoire de la glycosurie. M. E. Gripon.—Propriétés physiques des lames de collodion. M. H. Peslin. Théorie des tempêtes. Réponse à M. Faye. M. H. Hildebrandson.—Des courants supérieurs de l'atmosphère dans leurs relations avec les lignes isobarométriques.



No. 14. *M. Faye*. Résultats des observations faites en Suède sur les courants supérieurs de l'atmosphère. *M. Ch. Sainte-Claire. Deville*.—Sur les variations ou inégalités périodiques de la température (11<sup>e</sup> Note); période du vingtième jour dodécuple Novembre. *M. Sédillot*. Rapport sur un mémoire de M. J. Hennequin intitulé "De l'allongement du fémur dans le traitement de ses fractures." *MM. Musculus et de Marmé*. Sur un nouveau corps qu'on trouve dans l'urine après l'ingestion d'hydrate de chloral.

No. 15. *M. Daubrée*.—Chute de poussière observée sur une partie de la Suède et de la Norvège, dans la nuit du 29 au 30 Mars, 1875 d'après des communications de *MM. Nordenskiöld et Kjerulf*. *M. E.-J. Maumené*.—Note sur les bronzes du Japon. *M. A. Béchamp*. Du rôle des microzymas dans la fermentation acide alcoolique et acétique des oeufs. Réponse à M. Gayon.

No. 16. *M. Berthelot*.—Sur la reconnaissance de l'alcool ordinaire mélangé avec l'esprit-de bois. *M. Ferd. de Lesseps*. Sur les méthodes à employer pour le maintien des ports. *MM. Alf. Riche. et Ch. Brady*. Recherche et dosage de l'alcool méthylique en présence de l'alcool vinique. *M. Woillez*. Sur le spiroscope, appareil destiné à l'étude de l'auscultation, de l'anatomie et de la physiologie du poulmon. *MM. G. Hayem et A. Nachet*. Sur un nouveau procédé pour compter les globules du sang. *M. Couste*. Note sur la théorie des tempêtes. Réponse à M. Faye.

Journal des Savants. Febr. Mars. 1875.

Revue de Philologie et D'Ethnographie. Vol. 1. No. 3, 1875.

No. 3. *S. Blondel*.—Le Jade, étude historique archeologique et littéraire sur la pierre appelée Yu par les Chinois. *P. Hunfalvy*. Essai d'une Grammaire Ostiake. *M. Grünwald*. Grammaire Samoïede. I. les sons. II. phonétisme. III. l'harmonie des voyelles. IV. changement des voyelles.

Göttingische gelehrte Anzeigen. Nos. 1 to 16, 1875.

Revue des Deux Mondes. Vols. 8 and 9, March, April and May, 1875,

*M. C. Martins*.—Recherches récentes sur les Glaciers actuels et la période glaciaire.

Poggendorff's Annalen der Physik und Chemie. Vol. 154, Nos. 3 and 4, 1875.

No. 3. *J. L. Hoorweg*.—Ueber den Gang der Lichtstrahlen durch ein Spectroskop.

No. 4. *H. Helmholtz*.—Zur Theorie der anomalen Dispersion. *A. Topler*. Zur experimentellen Bestimmung des Diamagnetismus dur seine Inductionswirkung. *A. W. Wright*. Ueber das Spectrum des Zodiakallichts. *K. A. Holmgren*. Einige Bemerkungen zu dem Thomson'schen Elektrometer.

Jahresbericht über die Fortschritte der Chemie. Pt. 1, 1873.

Grammatik der Lebenden Persischen Sprache von H. L. Fleischer.

Die Griechischen Personennamen nach ihrer Bildung erklärt, mit den Namensystemen verwandter Sprachen verglichen und systematisch geordnet von Dr. A. Fick.

L'Ancien Orient; Etudes Historiques, Religieuses et Philosophiques sur L'Egypte, La Chine, L'Inde, La Perse, La Chaldée et la Palestine depuis les temps les plus reculés, par Léon Carre. (Vols. I and II).



Flora Indica; or Descriptions of Indian Plants, by the late Dr. W. Roxburgh.

The Descent of Man, and Selection in Relation to Sex, and The Origin of Species by means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life by C. Darwin.

The Book of Sér Marc Polo, the Venetian, Concerning the Kingdoms and Marvels of the East. 2nd Edition, vols. I and II., and Cathay and the way Thither, by Col. H. Yule.

An Icelandic-English Dictionary based on the MS. collections of the late R. Cleasby enlarged and completed by G. Vigfusson.

The Zoological Record for 1871 and 1872, vols. VIII. IX. edited by A. Newton.

A Map of Central Asia, prepared from the most recent Russian and English researches by the Royal Geographical Institute of Vienna, 1874.

#### *Exchange.*

The Geographical Magazine, Vol. II. Nos. 5 and 6, 1875.

No. 5. *Clements R. Markham*.—Travels in Great Tibet and Trade Routes between Tibet and Bengal. *Augustus Margary*. *H. P. Mallet*.—Indian Famines. *Col. H. Yule*.—Garden of Transmigrated Souls. Map of Sir D. Forsyth's Mission to Kashgar.

No. 6. *Prof. A. Vambery*.—Kulja. Khivan Mission to India. Report of the Great Trigonometrical Survey of India.

The Indian Antiquary. Vol. IV. Pt. 43, 44, 1875.

No. 43. *M. J. Walhouse*.—Archæological Notes. *Rev. F. T. Cole*.—Santali Riddles. *W. T. Sinclair*.—Sculptures of the Cave at Lonád Táluká Bhiwandi. *Rev. Dr. R. Caldwell*.—Observations on the Kudumî. *J. G. Bühler*.—A Grant of King Guhasena of Valahbhi. *J. F. Fleet*.—Sanskrit and old Canarese Inscriptions. *A. C. Burnell*.—Earliest Christian Missions in South India. *F. S. Growse*.—Translation of Copper-plate Grant at Udaypur. *Major J. W. Watson*.—Translation of Copper-plate Grant at Udaypur.

No. 44. *Major J. W. Watson*.—Sketch of some of the Principal Places of Snake-worship in Kâthiâwâd with a brief account of Thán and the Dhândal Tribe of Kâthis. *Rev. J. Cain*.—Native Customs in the Godâvarî District. *J. Muir*.—Religious and Moral Sentiments freely translated from Sanskrit writers. *J. F. Fleet*.—Sanskrit and old Canarese Inscriptions. *Rev. F. Kittel*. Seven Lingâya Legends. On the Review of the Panchatantra. Tamil Proverbs.

Nature. Vol. 12, Nos. 288 to 292, 1875.









PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR AUGUST, 1875.

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The Monthly General Meeting of the Society was held on Wednesday the 4th August at 9 o'clock P. M.

T. Oldham, LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were announced—

1. From the Editor, Prof. M. L. de Goeje, Leyden, a copy of a work entitled "Díwán Poëtä Abu-'l-walíd Moslim ibni-'l-walíd al-Anqárí."
2. From Major G. E. Fryer, a copy of—"The Life or Legend of Gaudama," by the Rev. P. Bigandet.
3. From Dr. G. Bühler, a set of five photographs of Copper Sásanas as follows:—

- |  |                  |
|--|------------------|
| 1. Guhasena I, 2nd half  | } of Válabhi.    |
| 2. Dharasena II, 2nd half                                      |                  |
| 3. Yayabhata, 2nd half   | } Gurjara Kings. |
| 4. Dadda II., 1st and 2nd halves                               |                  |
| 5. Givindarája, 2nd, 3rd, and 4th halves, Kâshtrakûta dynasty. |                  |

4. From Mr. Eyre, Deputy Magistrate of Sâsserám, forwarded through Mr. W. L. Heeley, an impression on sealing wax of an As'oka inscription found in a cave on the Chandan Pír Shahíd Hill near Sâsserám.

5. From Dr. O. Feistmantel, Geological Survey, a copy of "Die Bhagavad-gita" by Dr. F. Lorinser, Breslau.

6. From Major G. E. Fryer, a Kyeng Shield of buffalo hide.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members—

C. J. O'Donnell, Esq., C. S.

J. F. Hewitt, Esq., C. S.

Lt.-Col. Minchin.



The following are candidates for ballot at the next meeting—

S. S. Jones, Esq., B. A., C. S., Asst. Magistrate, Sasserám, proposed by Bábu Rájendralála Mitra, seconded by Mr. H. Blochmann.

R. R. Thomson, Esq., C. S., Asst. Commissioner, Karnál, Panjáb, proposed by Mr. D. C. J. Ibbetson, C. S. seconded by Mr. M. L. Dames.

The following gentleman has intimated his desire to withdraw from the Society.

E. Benedict, Esq., Calcutta.

The President announced that the Council had nominated, as fitting persons to become Honorary Members of the Society, Dr. Werner Siemens of Berlin, Dr. Böhtlingk of Bonn, and Prof. J. O. Westwood of Oxford.

The following were the grounds on which this recommendation was made :

Dr. W. Siemens, the elder of two brothers both famous and distinguished as practical physicists, has been from the first the most eminent and most useful of the pioneers of telegraphy. He first introduced the covering of telegraph wire with gutta percha and india rubber. He recommended the first submarine telegraph through the Red Sea, in order to establish direct communication with India from Europe. When this failed and telegraphing became so imperfect that letters often reached their destination before messages, he promoted with immense zeal and energy the Indo-European line by land, which has since worked and is working so well, that we have the London news of the evening before, in our morning papers. He has been more instrumental than any one else in making Telegraphic communication with Europe perfect, and is acknowledged to have been by far the greatest improver and perfecter of Telegraphy in general, thus becoming the general promoter of the most beneficial scientific improvement of modern times.

Dr. Böhtlingk is recommended in appreciation of the great services which he has rendered to the study of Sanskrit as evinced by his learned and elaborate Dictionary of the Sanskrit language.

Professor Westwood the celebrated entomologist, is recommended on account of the great service he has rendered to Indian (and generally to Asiatic) Zoology by numerous valuable entomological papers illustrated by his own hand; among which may be particularly mentioned his splendidly illustrated "Cabinet of Oriental Entomology" and his "Thesaurus Entomologicus Oxoniensis," just completed.

In accordance with the rules of the Society these names would be hung up in the Meeting-Room of the Society until the next ordinary meeting when they would be balloted for.



The President also announced that Mr. W. T. Blanford had been appointed a Member of the Physical Science, Natural History and Library Committees.

Further, that the Council were desirous of recalling all Library books now out with Members, in order that they might be incorporated in the new Catalogue now under preparation, and would therefore request members to return any books they might have. They would only be wanted for a short time.

Mr. Blanford said he wished to ask the President one or two questions relative to one of the nominations for Honorary Members just laid before the meeting.

The President asked under what rule?

Mr. Blanford replied that his questions related to business before the meeting.

The President said, that there was no business before the meeting.

Mr. Blanford then proposed and Major H. H. Godwin-Austen seconded the following motion—

“That in accordance with the provisions of Rule 28, clause *c*, the order of business under Rule 29 be suspended in order to the transaction of business of an urgent nature, *viz.* the question of the nomination of an Honorary Member, just laid before the Society.”

The President explained that the election of Honorary Members was not before the meeting, but that the Council had nominated three under the rules of the Society, and that they would be balloted for in the usual way at the next meeting.

Dr. Ewart, seconded by Major Fryer, proposed an amendment to the effect that the question raised by Mr. Blanford was not of an urgent nature.

The President said that the meaning of the proviso quoted by Mr. Blanford was clear, it was to admit of such rare cases in which it was urgently necessary that the business should be completed on the same evening, and therefore to dispense with the necessity of notice of motion. Now it was obvious that the question raised was not of this kind and, more than this, it was a question with which neither individual members nor the meeting at large could interfere. The candidates for Honorary Membership had been nominated by the Council, and the members could not interfere with that nomination. They could reject the candidates, but nothing more. He, therefore, in virtue of the power vested in him as President, ruled that the business brought forward by Mr. Blanford was not of an urgent nature, and would not come under the rules. He would, in consequence, decline to put either the amendment or motion to the meeting as such suspension of the ordinary business would be in opposition to the



rules of the Society. It was quite competent for Mr. Blanford to give notice of motion at the ensuing ordinary meeting of the Society.

Mr. Schwendler, in the absence of Col. Hyde, exhibited some specimens of telegraph cable known as *Hooper's Core*. This core, most curiously, was penetrated in several places by a kind of grass. Capt. Green had found the core in this state. It had been lying first, for a long time in water, and afterwards had been stored in a dry room, when he discovered that grass had pierced the India rubber, almost looking as if it had been done on purpose. Mr. Schwendler remarked that although it was well known, that cable core, no matter if consisting of gutta percha or india rubber, was frequently attacked by marine animals, as for instance by the teredo, (a borer) and by the barnacle, a shellfish, it was quite novel to him, that vegetation might also act as an enemy to subterranean and submarine telegraphy. He need scarcely mention that in each place where grass had pierced the india rubber, the cable had become faulty, and in the points where the grass actually touched the copper wire, there was what is technically called dead earth, which destroyed entirely the working efficiency of the cable. He said the most probable explanation was that seeds had become attached to the core when under water, and had afterwards germinated when the core was stored. The store room had been dark and hot, the core wet, and thus all the conditions for a vigorous growth were fulfilled. The germs having come to life, not finding sufficient earth near them, pierced the core in search of nourishing substance which most likely was present in the india rubber.

The practical results of these facts were, that proper care should be taken when storing up insulated core in this country. *The core should either be entirely dry or entirely under water.*

Mr. Kurz had been asked to ascertain the kind of grass, but was unable to do so from the dried up specimens given to him.

Major Godwin-Austen exhibited a Celt, found in the Khasi Hills at Shillong, and made the following remarks thereon:

This celt, presented to the Society by Capt. W. Badgley, Assistant Supt. Topographical Survey, was found by him at Shillong, in the Khasi Hills, on the bridge near Col. McCulloch's house, lying on the surface. It was apparently of the hard slates that occur near Maoifang and had been ground into shape. It was very similar in form to one presented to the Society by Mr. H. B. Medlicott and which he obtained at Dibrugarh. These softer kinds of stone implements, he believed, were used as hoes, and some of the Kukis in the north Cachar Hills used a few years back stones set into a wooden handle in this way, for when the ground is soft during the rains they aid materially in tearing out the weeds. From the facility with which they can now get iron implements, stone will be scarcely or ever used. Col. McCulloch had told him they are very frequently found in Manipur.



Mr. Medlicott remarked that the stone hatchet he had brought from Upper Assam two years ago was of the same shape as that exhibited by Major Godwin-Austen, but smaller and of a softer more earthy stone. It had been found two feet under ground in a plantation near Dibrugarh.

Letters were read—

1. From H. J. Rainey, Esq., forwarding the following note on the (probable) origin of the scientific appellation of the common striped squirrel (*Sciurus palmarum*, Linnæus).

"According to Jerdon,\* Indian naturalists appear to be sorely puzzled to account for the common or striped squirrel being designated *palmarum*, but I have just happened to discover, I think, the reason—such as it is—why it has been given that specific appellation by Linnæus.

Having occasion to refer to the "Travels of Van Linschoten," who journeyed in India towards the close of the sixteenth century, for some particulars regarding the early Portuguese in this country, I chanced to come across a passage, which appears to have somehow escaped my attention before now, and which, I venture to think, satisfactorily explains the origin of the specific name *palmarum*, universally applied by naturalists to our well-known striped squirrel. In describing the various animals abounding about "the towne and island of Goa" in quaint terms, he gives a curious, but sufficiently correct, description of what I cannot help taking to be our palm squirrel. After shortly noticing the "Monkies or Marmosets," which, he says, "doe great hurt to the Palme trees," he proceeds on, thus:—"In those trees you shall commonly see certaine little beasts called *Bichos de Palmeyras*, that is, *Beasts of the Palme trees*: They are much like Ferrets, wherewith men vse to hunt and catch Cunnies, and have a taile like the Penner of an Inke-horne, and grayish speckled haire: they are prettie beasts to keep and to pass the time withall."†

There can be no doubt, I believe, that this is no other than our veritable so-called palm squirrel, and it is most probable that Linnæus named it *palmarum* from its Portuguese designation aforesaid,—*Bichos de Palmeyras*, or 'Beasts of the Palm tree.'

It would be worth knowing if these squirrels are still numerous about Goa, and if they are there to be met with more frequently on the palm than any other kind of tree. Should they be found in Goa to evince no partiality for the palm as their abode, then the eminent Swedish naturalist, who may be said to be the founder of botanical science, was evidently misled by the inaccurate observation of the early Portuguese in India in this particular, and induced to give it, if not an absolute misnomer, at least an inappropriate designation which is most liable to give those unacquainted

\* *Mammals of India*, London, 1874, p. 171.

† *Early Travels in India*, First Series, Calcutta, 1864, p. 223.



with the animal in its wild state, an erroneous idea of its habits. It has therefore often occurred to me, and doubtless to many others besides, that it would be well if scientific nomenclators could be induced to change its specific appellation *palmarum* for *striata*,\* especially as none of the other several species of the striped squirrels, to wit, the jungle, the Travankor, and Nilgiri squirrels have that specific designation, being denominated, respectively, *S. tristriatus*, *S. Layardi*, et *S. sublineatus*.

2. From Dr. W. Munroe, Fife, Scotland, requesting information regarding the mention of Leprosy by ancient Hindu writers. Dr. Munroe asks—

1. Can the time at which mention is first made of Leprosy be indicated approximately?

2. Is it when first spoken of mentioned as a disease then common all over India, or is there any indication of its having been imported from the West?

3. Are any of the books from which the Susrutas is compiled as old as 1300 years B. C. and are the notices in regard to Leprosy contained in these very oldest parts of the work?

I am inclined to think from my inquiries on the subject, that leprosy was originally a disease of Central Africa which has spread and is still spreading wherever constant and continued human intercourse has been or is carried on.

My reference to the time 1300 years B. C. has of course reference to the Exodus of the Israelites.

P. S. I would be very grateful for any references to translations into English or French, likely to be available in this country of Hindu works, referring to leprosy.

These questions were referred to Bábu Rájendralála Mitra, who has been good enough to supply the following information on the subject—

“I regret I cannot answer the first question of the Doctor categorically. Taking Sus'ruta to be 400 B. C. (this date is Wilson's, I take him to be two centuries older) we must look for the date of Charaka whom he quotes, in the sixth century B. C. Sus'ruta professes to record the lectures of his tutor Dhanvantari, and very sparingly quotes his predecessors; but his chapter on Leprosy is founded on Charaka, as Dr. Munroe will easily perceive by comparing Hessler's translation in Latin (published at Leipzig) with the enclosed from Charaka, which I have got prepared from him. In Sus'ruta's time Charaka was an old authority of great weight, and an interval of two centuries between the two is by no means an extravagant guess. Now Charaka quotes Atreya who was a son of Atri, a sage of great renown, who

\* *Penstriata* would perhaps be better still, in contradistinction to *Tristriata*.



is named in the Vedas, and was the author of one of our text books on Law. The name of *Ātreya* occurs in *Pāṇini*, whose date Goldstücker takes to be the 9th century B. C. It is also met with in the *Rig Veda Saṁhitā*, which dates from the 14th century B. C. *Charaka* also quotes *Bágbhaṭa*, who, likewise, has a chapter on Leprosy. *Bágbhaṭa*, again, quotes *Agnivesa*, who was a great grammarian, and is named in the *Madhukāṇḍa* of the *S'atapatha Bráhmaṇa* of the White Yajur Veda, and *Játukarṇa*, who is named in the *Yájnāvalkyā Kāṇḍa* of the same Veda. The works of the last two are lost, but on the authority of *Bágbhaṭa* we may fairly accept them to have been professors of medicine, though it is impossible to say whether they wrote on Leprosy or not. *Manu* mentions leprosy, but the recension of *Manu* we now have is supposed to be not older than the 6th century B. C. In *Sus'ruta's* work the word *Kushṭha*, the Sanskrit name for leprosy, has been used in a generic sense, and includes several cutaneous diseases which are not leprosy, but from *Ātreya's* description quoted by *Charaka*, it is evident that the word primarily meant leprosy. It does not occur in the *Rig Veda Saṁhitā*, which dates from the 15th century B. C., and if we could accept this negative evidence to be of any weight, we could say that the disease was not known in the 15th century; but as there is no reason why the name of a disease should occur in a book of hymns, it is of no value; while the name of *Ātreya*, which occurs in that Veda and has been cited as that of an authority on the subject, would carry us much beyond the 18th century B. C. to which *Dr. Munroe* limits the enquiry.

"The second question I can answer positively by saying there is no indication whatever of leprosy having been imported from the West.

"The third question has been already answered by my remarks on the first.

"I am not aware of any English or French translation of any Indian work on leprosy except what occurs in *Wise's Hindu System of Medicine*. I regret I have not a MS. of *Bágbhaṭa's* work at hand to translate from."

*Extract from the Charaka Saṁhitā on the Pathology of Leprosy.*

"*Ātreya* says—'When the seven elements of the body become vitiated through the irritation of the wind, the bile, and the phlegm, they affect the skin, the flesh, the spittle and the other humours of the body. These seven are the causes respectively of the seven varieties of *kushṭha*. The *kushṭhas* thus produced, cause much pain and suffering. None of these varieties results, however, from the vitiation of a single humour. *Kushṭhas* are of seven, of eleven, or of a larger number of kinds; and these, constantly irritating the system, become incurable.' We shall give a brief account of these as they are produced by the vitiation of the different humours. The wind, the bile, and the phlegm, being vitiated, react on the skin, &c. When the wind is most vitiated it produces the *kapāla kúshṭha*, the bile the *audumbara*, the



phlegm the *maṇḍala*, the wind and the bile the *rishyajihvā*, the bile and the phlegm the *pauṇḍarika*; the phlegm and the wind the *sidhma*, and the three together the *kákanaka*.

"Excessive physical exercise after exposure to too much heat or too much cold; taking food after surfeit; eating of fish with milk; using barley and several other grains, such as *hayanaka*, *dalaka*, *karodusā*, &c., along with venison, milk, curdled milk, and buttermilk; excessive sexual intercourse; long protracted excessive fear or labour; fatigue, interruption of catarrh, &c., vitiate the phlegm, the bile and the wind, hence the skin and the three others become slackened. Thus irritated, the three elements corrupt the skin and others, and produce *kushṭha*.

"The premonitory symptoms of *kushṭha* are as follow: Want or excess of perspiration, roughness, discolouration, itching and insensibility of the skin, pain, horripilation, eruptions and excessive pain on the parts that are about to fall off.

"Some *kushṭha* eruptions are red, rough, spreading and small; they cause horripilation, slight itching, pain, and discharge of matter and sanies. These are caused by wind, and are called *kapāla-kushṭha* (scaley).

"Those that are of a coppery colour, which discharge matter, blood and sanies, cause itching pain, inflammation and burning, and produce worms, are also caused by wind. They appear like the ripe fig, and are hence called *auḍumbara*, (fig-like).

"Some are cold to the touch, raised, hard, reddish-white, clammy, itching and infested with worms. These too are caused by wind; they are called *maṇḍala* (circular).

"Those which are rough, red, white, yellow, blue or coppery, producing itching pain, worms, burning sensation, and insensibility, are also caused by wind. They have the appearance of the tongue of an antelope, and are hence called *Rishyajihvā*.

"Those which are white or red, spreading and elevated; which discharge blood, pus and sanies, and produce itching, are also caused by wind. They appear like the leaves of the white lotus, and hence are called *Paṇḍarika*.

"Those that are rough, red, thin, internally cold, sometimes reddish-white, which cause slight pain, itching, burning, and discharge of pus and sanies, are also caused by wind. They appear like the flowers of the pumpkin, and are called *sidhma*.

"*Kákanaka* and others have all the symptoms of *kushṭha*. They are incurable, while the others are curable. That which is incurable, can never be cured, and those which are curable sometimes become incurable.

"The wind causes coppery red roughness, pain, inflammation, shrinking, horripilation and insensibility of the skin. The bile produces burning, perspiration, pain, discharge of blood and suppuration. The phlegm causes whiteness, coldness, itching and confluent pimples.



"The worms, that form in leprous eruption, destroy the flesh, skin, veins, muscles and bones. When affected by them, the patient suffers from spontaneous discharges of blood, insensibility, loss of sensibility of the skin, mortification, thirst, fever, dysentery, burning, weakness, disrelish and indigestion. Then *kushṭha* becomes incurable. The man who neglects the disease at its commencement is sure to die. He who at the first breaking out of the disease tries to get rid of it may be sure of its being cured."

3. From Bábu Rájendralála Mitra, regarding a mistake in his paper on the Skanda Gupta inscription from Anupshahar. The following is an extract from it:

"Owing to the fact of my having been in the mufassal, away from my books, when I wrote my paper on the Skanda Gupta inscription from Anupshahar, I had to depend a good deal on my memory, and it has, I am sorry to find, betrayed me in one instance. I have been made to say in a part of that paper (Journal XLIII, part I, p. 371) that Mr. Fergusson accepts the title *Mahárájá* to be synonymous with Emperor, when in reality it is the *Adhirájá* or *Mahárájá Adhirája* to which he refers. (Journal Roy. As. Soc. IV, p. 84.) This, however, does not in the least affect the line of my argument, for I hold that when two sovereigns are not mentioned in the same document, the titles of a sovereign afford no indication of his real position. In the hyperbolic language of Indian panegyrists every sovereign is a second Indra, and there is no title, however lofty, which is not deemed fit for him. Still, as Mr. Fergusson has thought fit to make it a matter of serious complaint, and for the sake of accuracy, it is desirable that the correction should be prominently made, I request the favour of this letter being inserted in the Proceedings for August next."

5. From Bábu Rájendralála Mitra, forwarding the following extract from a letter from Mr. E. Thomas.

"I have received your interesting paper on the transcription of the name, and the interpretation of the title, of Kunanda. In regard to the former point I am now inclined to go with you, and even beyond you.

"There can be no doubt that 𑀘 is *ku* in Indian Pali and 𑀓 is *bhu* in the same alphabet—equally, in Bactrian Pali, is 𑀭 *kr* and 𑀮 *bhr*. But the larger question now arises as to which of the two was the dominating and leading alphabet in the coins under notice. I am quite prepared to admit, both in virtue of the locality of issue and the ordinarily greater perfection of the Indian Pali letters, that the alphabet in question must take precedence; this is further supported by the singular use of the Indo-Pali 𑀧 *jḥ* in the Bactrian legend of the B. M. coin to supply the place, we must conclude, of the hitherto undeveloped Bactrian *jḥ*, which appears as 𑀧 on the coins of Zoilus for the first time, and is conspicuously absent from the Kapurdi-giri and other inscriptions.



"If the age of Kunanda is rightly determined (which of course is still a very open query) we may justly infer that the Bactrian Pāli had not yet penetrated in force, as the official alphabet, as far as the banks of the Jumna.

"These points being conceded, I may readily accept your reading of *ku* for both versions; but I have a surprise for you, in the fact that a new coin of Col. Guthrie gives the name  $\text{𑀭𑀺𑀓𑀲}$  *Kunindasa*, as in the tribal name noticed in your P. S.

"In common consistency having surrendered the *r* in the name, I am bound to do the same with the title, though I would point out to you, that the Sanskrit "adages" about brothers hardly apply to this case, unless you can make the king a representative Indian *Aryan*. We have plenty of instances in proximate localities and not distantly removed periods, where the title of Brother appears in high honour. For instance, the  $\text{ΑΔΕΛΦΟΥ ΤΟΥ ΒΑΣΙΛΕΥΣ}$  (p. 205 Prinsep's *Essays*), *Mahārāja Bhrata* (p. 203), *Spahora Bhrata* (p. 204), and *Godophara Bhrata*, with  $\text{ΑΔΕΛΦΙΔΕΥΣ}$  (p. 216).

"You enquire what my opinion is about another paper of yours, in respect to the Saka dates. I have always stood up for the extended application of the Saka era in early documentary monuments, and especially in Gupta dynastic inscriptions, but I discriminate between the mere use of such dates in the Gupta *proper* documents, and the *post* Gupta references implied in "after the repose of Skanda Gupta," and the 585 years of the Guptas having elapsed (*J. R. A. S.*, (old series) Vol. XIII, p. 5, note; 1850,) both of which points have been alluded to in my *Indian Weights* (note, p. 46). I do not see that the new translation of the Gupta passage from Albiruni at all alters the main inference, that the Vallabhis succeeded the Guptas, which fact is all that we need really care for.

"Mr. Burnell has been so obliging as to send me a copy of his "Southern Indian Palæography" in which he contests my, what he calls, lately propounded theory about the Laṭ alphabet (p. 6). But our Bengal friends have only to be told, that he quotes Prinsep solely from our *Journal of 1837* (Vol. VI, pl. xiii), seems never to have seen Prinsep's collected *Essays*, and knows nothing of the later labours of Norris, Wilson, Dowson, Cunningham, &c., to understand how unsafe a guide he is likely to prove in demonstrating the rise and progress of the earlier Northern alphabets of India."

Bābu Rājendralāla Mitra said that it was very gratifying to him to note that the reading and translation of the Kunanda coin, which he had suggested, had met with the approval and support of so distinguished an antiquarian as Mr. Thomas. He concurred with Mr. Thomas in the opinion that the Indian Pali was the leading and dominating alphabet, and that the Bactrian character was subsequently adapted to the vernacular of the time, very much in the same way, he thought, as the Arabic character



had subsequently been employed in writing the Indian dialects. This theory alone could explain the gradual introduction, and improvement in the forms, of certain letters which the Bactrian did not originally possess, but which formed a component part of the Indian Pali. The discovery of the name Kuninda in one of Col. Guthrie's coins was, he said, a remarkable one, and would open quite a new field of enquiry. He admitted that the adage about brothers was not quite convincing, and that there were several coins in which a brother's name had been invoked to shed lustre on the names of the authors of those coins. In such cases, however, the brothers were kings; but in the case of Kunanda, there was nothing to show that Amogha was a royal predecessor or contemporary, as the name appears without any regal title attached to it. It is well-known that Muhammadan sovereigns were proud to call themselves *ibn ul sultán*, but when one's father happened not to be a king no such allusion was made. The Bábu had taken the precaution to note this pointedly in his paper.

The Bábu also observed that he concurred with Mr. Thomas in making a distinction between the dates of the Gupta dynastic inscriptions and those of post-Gupta records; but he denied the reading of "repose of Skanda Gupta." The words *sánta* and *bhukta* on which reliance has usually been placed to produce that sense, correspond in every instance hitherto discovered with the word *varsha* 'year,' and simply mean 'on the expiry of the year so and so.' Where the Gupta era was intended the term *Gaupte* was employed, as in the Bádámi inscription published in the last October number of the *Indian Antiquary*. This era, the Bábu supposed, commenced with the expulsion of the Guptas from Guzerat, and not from their extinction.

The following papers were read—

1.—*Supposed Greek Sculpture at Mathurá.*—By F. S. GROWSE,  
M. A., B. C. S.

(Abstract.)

In 1836, Col. Stacy discovered at or near Mathurá a large and curiously sculptured block of red sandstone, which has given rise to much antiquarian discussion. It was carved on both sides with a Bacchanalian group, the principal figure in which was supposed to represent Silenus, and the whole to be the work of Bactrian Greek artists. The stone is now in the Calcutta Museum. During the cold weather of 1873-74, Mr. Growse discovered the companion block in the small village of Páli-Kherá, beyond the boundaries of the Mathurá township, close to the numerous mounds in most of which Buddhist antiquities have been discovered.

Mr. Growse then describes the figures and shows that the stones could not have been tazzas, as supposed by Col. Stacy, James Prinsep, and others. In his opinion the central figure is the wine-bibbing Balaráma, one of the tutelary divinities of Mathurá, attended by his wife Revatí and the other



refined, as it did at Amravarti, it became more vigorous and more local in its manifestations." (p. 269.) Not wishing to rely upon my own judgment in a case in which so great an authority had expressed a decided opinion, I communicated the above remark to Mr. H. H. Locke, of the Government School of Art, Calcutta, who has devoted his whole life to the study of art professionally, and is the most competent to decide the question without any native or patriotic leaning, and I got the following in reply from him; "I cannot at all support the quotation which you send me from Fergusson. I do not perceive any more of "Greek feeling" in the Ganes'a version of the fighting scene than in the Rānī Gumphā rendering. As to the Ganes'a carving being "first Greek attempt," and the Rani "a degenerate local manifestation of it" there is absolutely nothing in the carvings themselves to support such a notion. The Ganes'a carving (so far as can be judged of in its present very mutilated state) is rather the ruder of the two." Without caring to decide who is right in the case you will, I have no doubt, readily admit that the evidence which can yield such diametrically opposite results, must be extremely faulty.

"The next test is relative proportion. It has generally been accepted as a very good test for determining the nationality of human figures; but seeing, that no two masters of the Hellenic art adopted the same relative proportions, and further, that they are subject to extensive variations according to age, sex, and other causes, not to advert to the fact that specimens of ancient Indian art are generally of so primitive a character that they are not amenable to technical rules, it is hopeless to deduce from them any reliable evidence for a general premiss. Doubtless there are certain peculiarities in proportion, which if properly studied by experts,—such, for instance, as the breadth of the head along the eyes, which in Greece almost uniformly measured five eyes, would doubtless be of value as collateral proofs, but they can under no circumstance be accepted as well-established majors for any universal conclusion.

"But while denying general appearance and relative proportions to be of much value as tests, I must admit that there are points in sculpture which must be accepted as conclusive. These refer to the representation of local peculiarities in art, and their value depends upon the amount of certainty with which their local character is established. Thus, for instance, the disposition of the hair of the head, which differed greatly at different times among different nations, and which, whenever the styles and their ages are well-known, must at once determine the nationality of the figures on which they are found.

"In the same way, in well-finished statues the high cheek bones and other peculiarities of feature, as also drapery, may be accepted as good tests to that end. Posture or pose being generally dependent on the nature of action intended to be indicated, and human nature being everywhere alike



and liable to produce the same or similar postures under similar circumstances, is not always a safe guide. The exigencies of art have also a great deal to do in the pose of a figure, without in any way indicating a necessary borrowing. This is best illustrated by two figures published in the 3rd Volume of General Cunningham's *Archæological Report*. In one of them we have the chariot of the Greek Apollo and in the other that of the Indian Sun. The workmanship of the two is as unlike as possible, but the figure of the chariot and the pose of the horses are alike. Now at first sight the latter may appear as a copy of the former, but bearing in mind that the chariot in Greece and India was of the same shape, we may ask could an artist, whether Greek or Indian, represent effectually horses in bas-relief in other than profile or three quarter view? A front view of a horse in bas-relief would show only the forepart, or must project considerably more than what any bas-relief would admit of; consequently the Greeks generally adopted the profile, or the three quarter view, in the former case ranging their horses, when more than one had to be shown, in a line so as to show the side of one, and parts of the heads and legs of the others, and in the latter case showing the front view of the chariot with half the number of horses running on one side and the other half on the other, an arrangement which militated against all laws of the resolution of forces. This unnatural position was necessary for the sake of art, and could not be avoided; and if we find a similar disposition under similar circumstances in India, we see no reason to assume that it must necessarily imply a borrowing or interchange of art. There are nevertheless peculiarities in pose which when well-known may be depended upon.

"But the most valuable tests are representations of local vegetation,—such as the acanthus capitals noticed by General Cunningham in the Eusofzai country,—local styles of ornament, local dress and the like. These can leave no room for doubt, and when they do exist and their local character is fully established, we may with perfect safety come to a positive conclusion. In making these remarks, it is the farthest from my wish to deny the possibility of detecting Greek art on sculptures found in India, or to withhold my assent to particular pieces of Indian sculpture being Greek or imitations of Greek work, but I cannot help thinking that the theory of Greek art in India has been a great deal too much over-worked of late, and conclusions drawn which are not admissible on the premises at our command.

"Applying these principles to the sculpture discovered by Mr. Growse, we find that its general appearance is not Greek, its relative proportions are not such as could be declared exclusively Greek, and its details are not of a Greek character. The paunchy figure of the so-called Silenus, is as unlike Greek of the post-Phidian age as can be; the females with their large busts, heavy earrings, and massive neck ornaments, are not the counterparts of the Venuses and Dianas of Greek art, and the páyajama and chapkan of flowered



muslin in the Stacy group are garments which were unknown to Greek artists. Doubtless the art displayed in the two pieces of sculpture is superior to what we are accustomed to in other parts of India at a later age, but such of the ancient sculptures of Mathurá as have come to light along with these, and which are thoroughly Indian in subject, are not much inferior to them, and making due allowance for the decayed character of the Udayagiri, Sanchi and Amarávarti sculptures there is nothing to show that those who designed and carved them could not produce the Mathurá figures.

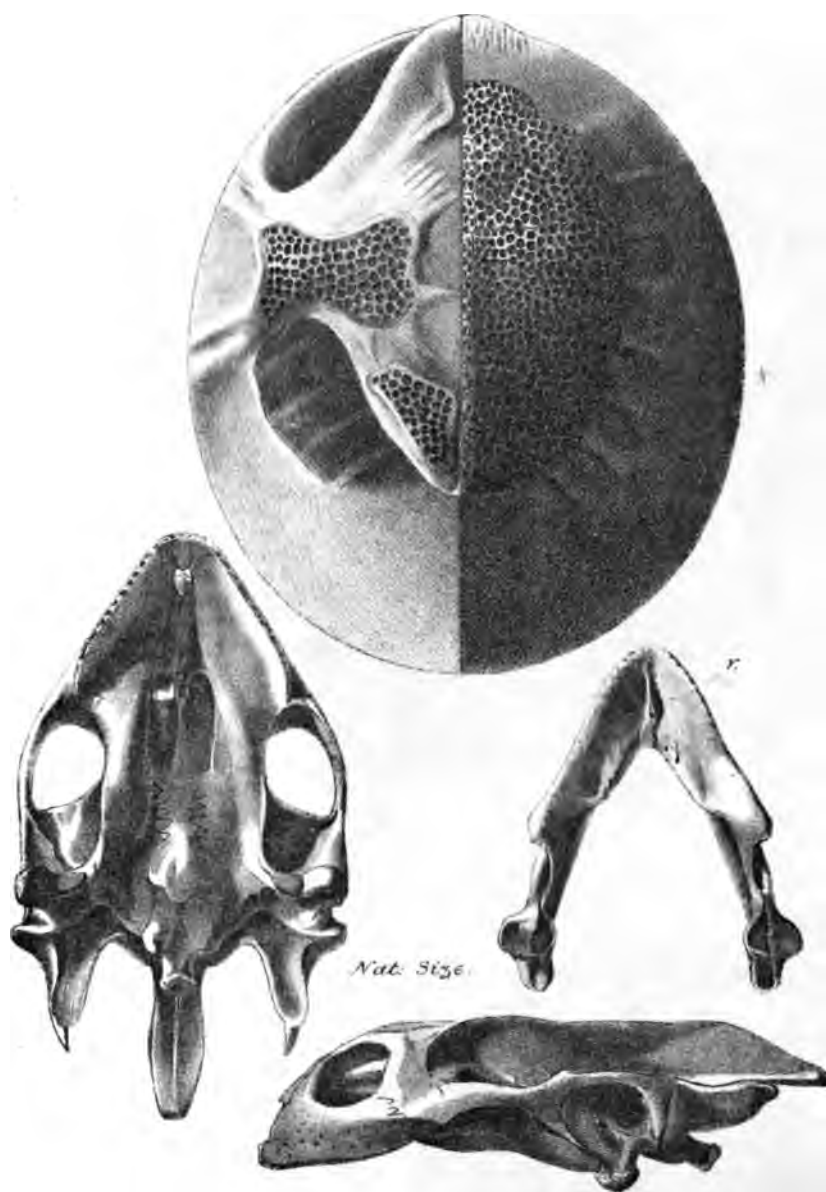
"With reference to the third question, I regret to have to differ from Mr. Growse in the opinion that the stones were intended for bases of pillars. When I first received his paper, I was led to think that he was right, and accordingly wrote to him to say that I would have to give up the opinion which I had before expressed of the stones being fountains or tazzas. But a thorough study of the subject induces me to revert to my old opinion. The top of the Stacy stone is carefully cut into a shallow circular cup and polished, so as to indicate that it was intended to be kept exposed and hold a fluid. Such a cavity could never be intended to serve as a receptacle for the end of a pillar. The Indian mortice is a square hole roughly cut and never polished, and this is the case with every stone that has been yet discovered in Muthurá, and the tenons are always in keeping with it. There is nothing to show that there ever was a departure from this rule in any case, and *à priori* it may be said that as a mechanical contrivance the shallow cup would never be equal in strength and security to a square mortice. I have not had an opportunity of seeing Mr. Growse's stone, but from the drawings and photographs sent by him the outline of its top appears like that of a shallow basin, which I imagine it to be. The stones are besides so shaped as not to be at all fit for stylobates. Their flatness, with carvings on two sides, would unfit them for such a purpose. As ornaments for a garden or courtyard, as fountains or tazzas, they would appear much more appropriate and befitting, and I am therefore disposed to take them for such."

2.—*Observations on some Indian and Burmese species of Trionyx, with a Rectification of their Synonymy and a Description of two New Species.*  
By W. THEOBALD.

(With Plates II, III, and IV.) γ √

Since the publication of my observations on Indian *Trionyches* in the Proceedings for 1874, I have obtained additional materials for the study of the group, which, after due comparison with specimens in the Indian Museum, Calcutta, and with specimens previously in my own possession, suggest certain important modifications of the synonymy of our Gangetic species.





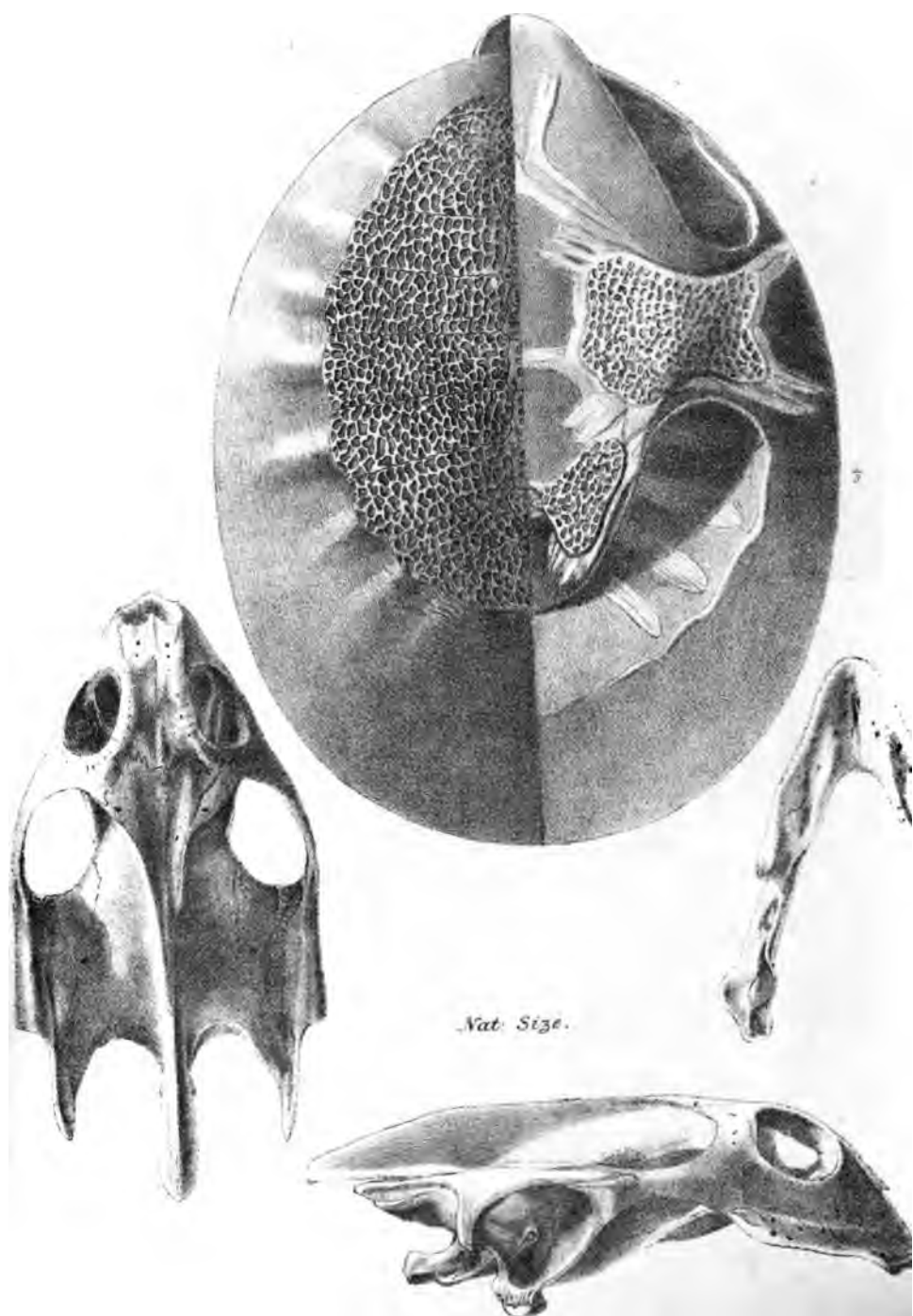
*J. Schaumburg, Lith.*

T. GRAYII. n. s.









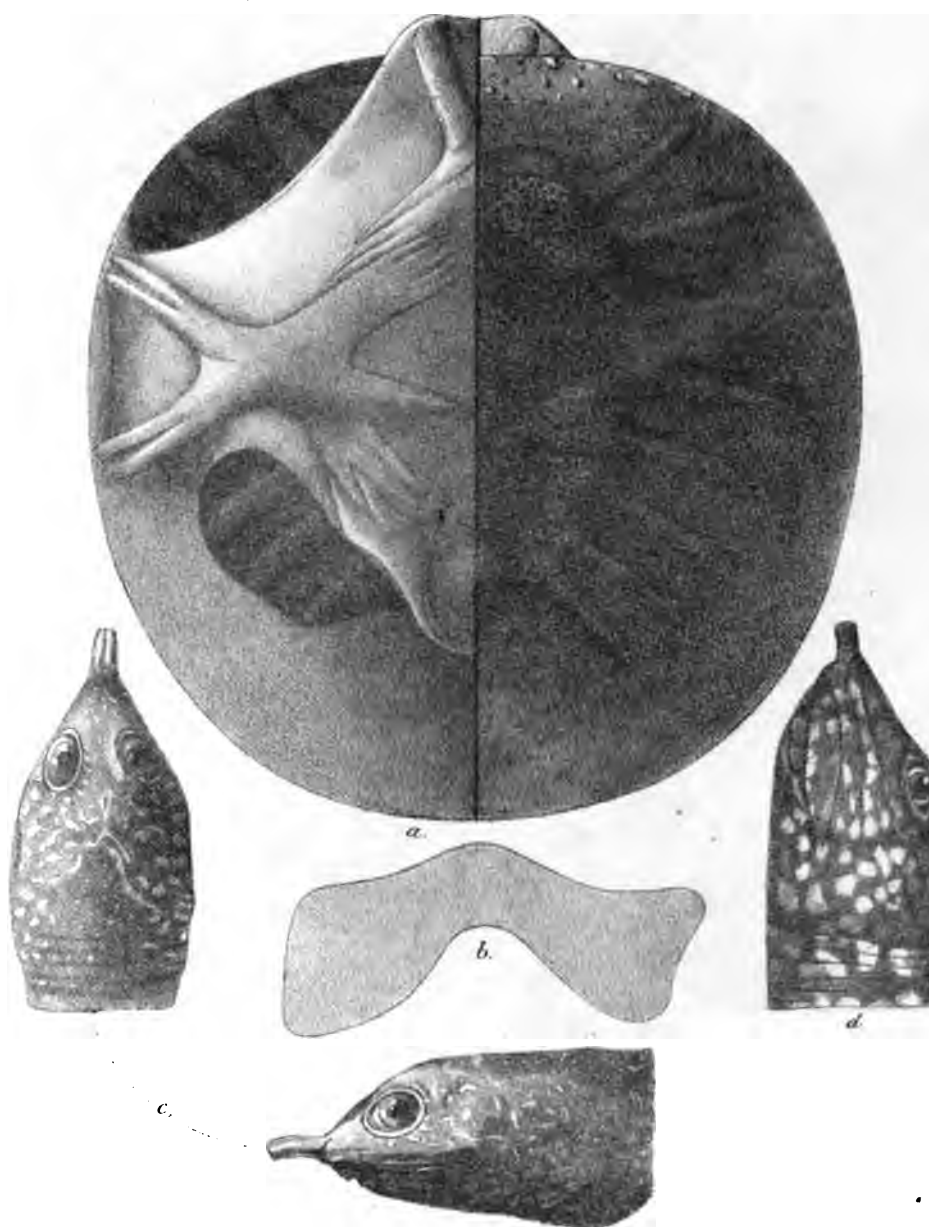
*J. Schaumburg, Lith.*

T. OCELLATUS. Buc: Ham:  
T. hircum. B. H. apud. J. Anderson.









J. Schaumburg, Lith

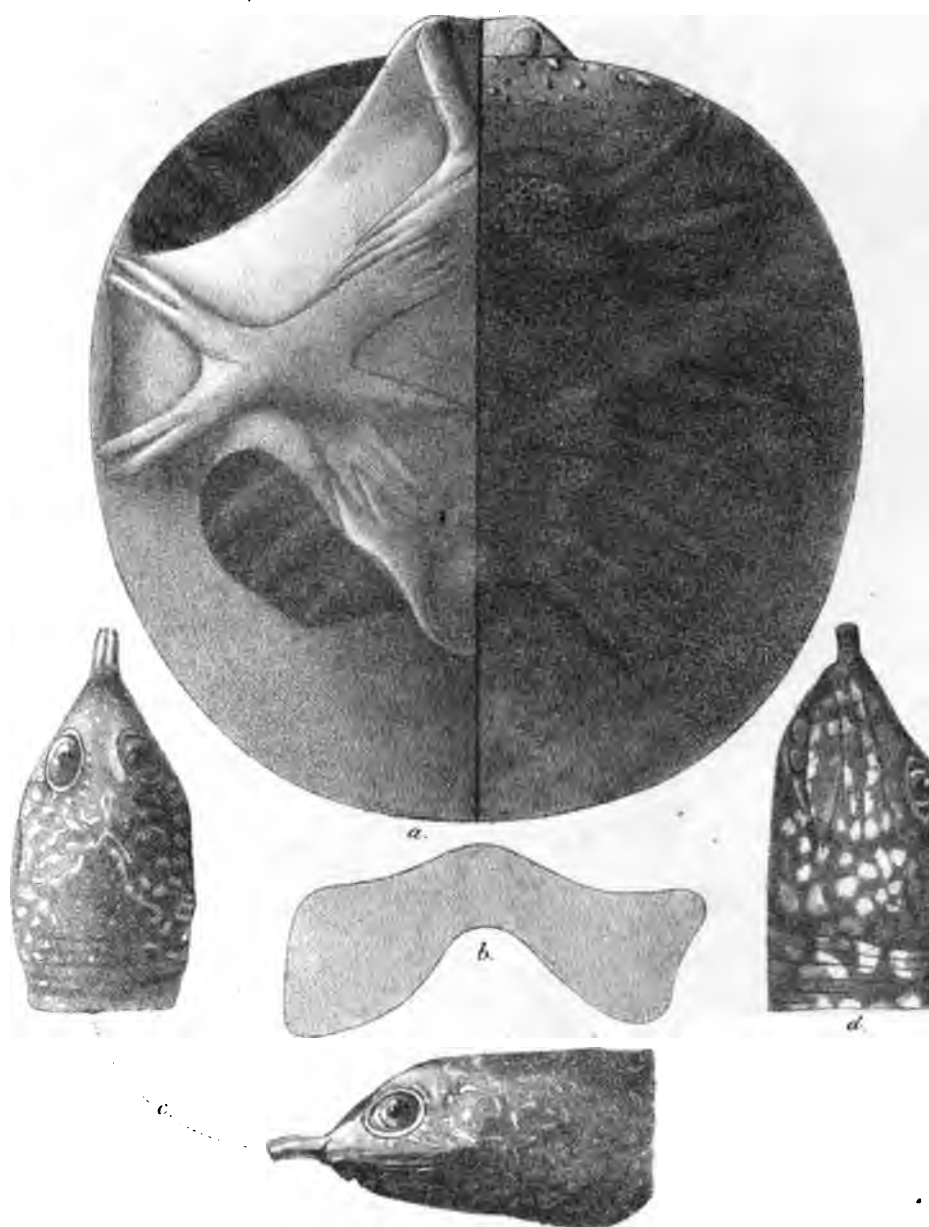
a. b. c. T. EPHIPPIUM. n. s.

d. T. JAVANICUS. Geoff.









J. Schaumburg, Lith

*a. b. c.* T. EPHIPPIUM. n. s.

*d.* T. JAVANICUS. Geoff.







The species I propose to notice in this paper are *T. Gangeticus*, Cuv.; *T. sewaare*, Buch. Ham.; *T. ocellatus*, Buch. Ham.; *T. Phayrei*, Theob.; *T. stellatus*, Geoff.; *T. Peguensis*, Gray; *J. Grayii*, n. s., and *T. ephippium*, n. s.

The most important result of the proposed rectification of the synonymy of our Bengal species is the separation of a third species which by later writers seems to have been confounded under a closely allied one, so that the number of species satisfactorily known in Bengal is raised to three; and the discrimination of two new species of the genus from the Burmese countries, east of the Bay of Bengal.

*T. Gangeticus*, which may be regarded as the type of the genus, has from its great variability of colours, no less than from the imperfect material in museums, received a number of synonyms, of which the more important only are here given.

T. GANGETICUS, Cuv. (R. A.)

<i>T. stellatus</i> , var. <i>Japonicus</i> , Schl., F. Jap.	} Gray, Cat. Tort. Croc. and Amphisbæniæ.
<i>T. hurum</i> , Buch. Ham. and Illus. Ind. Zool.	
<i>Gymnopus Duvaucellii</i> , D. et B.	
<i>Testudo chin</i> , Buch. Ham.	
<i>Test. ocellata</i> , Buch. Ham.	
<i>Aspidonectes Indicus</i> , Fitz., Gray., Sup. Cat. S. R. p. 97.	
<i>T. Javanicus</i> , Gray (not Cuvier), Illus. Ind. Zool.	
<i>Tyræ Javanicus</i> , Gray, Cat. Tort. Croc. and Amph. p. 47.	
<i>T. gatajhol</i> , Buch. Ham. ( <i>gatajhol</i> Gray).	
<i>T. hurum</i> , Buch. Ham., Anderson, A. & M. N. H. Vol. IX, p. 382 (1872).	
<i>Ganga kachim</i> of the Bengali fishermen.	

From some reason or other, young individuals of this species would seem to be rare in Calcutta, as none exist in the Indian Museum (that is in a recognisable state), though adults are commonly brought to market, I believe, mostly from the direction and neighbourhood of Faridpur. Dr. Anderson asserts that the young are not ocellated, a statement which is met by Dr. Gray, by his figuring two young specimens of typical *Gangeticus*, each displaying four ocelli (P. Z. S., 1873, Pl. VIII). The smaller specimen, a little over one inch in length, displaying four symmetrical ocelli, whilst the larger one, measuring over three inches, displays the ocelli regularly shaped, the posterior pair being elongated and divergent, very much after the fashion of the spots in the figure of *hurum* in Buch. Hamilton's drawings, whilst both possess the radiating black lines on the head peculiar to the present species.

An equally serious error to that made by Anderson respecting this species, is made by Dr. Gray regarding the character of the genus, where



he ascribes to it only four sternal callosities, and where he makes six sternal callosities a generic character of *Landemania*. Now a fifth callous 'lunate' bone in the sternum is found not only in the present species when fully adult, but in *ocellatus* (= *hurum* of Anderson) and *Phayrei*, Theob. and is doubtless a generic character of *Trionyx* though not developed in early life, nor perhaps till extreme age. The sternum of *Landemania* figured by Gray (in the Sup. Cat. S. R. p. 96) is that of a *Trionyx*. The animal was not full grown, as may be inferred from the unankylosed suture of the abdominal plates, and the callosity of the lunate bone in front is at that age (as I have seen examples in *Gangeticus*) being developed from two osculant centres; though the figure would suggest the idea of the lunate bone being divided by a median suture, which of course it is not, and the idea is unfortunately supported by Gray speaking of these two osculant patches on the lunate bone as a 'sternal pair' in precisely the sense he refers to the abdominal or caudal pairs. This is a mistake, and as far as its sternal characters go *Landemania* is nothing more nor less than *Trionyx*.

Equally open to suspicion are the sternal characters of *Aspilus* (A. & M. N. H. 1872, Vol. X, p. 339, and Sup. Cat. S. R. p. 101), where the sternal callosities are described as "two lateral." Buch. Hamilton's figure of *T. gatajhol* would seem to be answerable for this character, but I cannot help thinking that the two lateral callosities seen in the above figure are *no callosities* at all, but scars or abrasions accidentally produced, the more so, as the figure is drawn from life, and in the living animal the bony callosities are not apparent but only become visible as the epidermis covering them dries and contracts over them. Dr. Gray, it is true, describes the linear callosities (without figuring them, which is curious) in a Javan specimen of *A. cariniferus*, but I see no ground for supposing that the *scars* (as I believe them to be) represented in the drawing of *gatajhol* represent callosities at all.

*T. Gangeticus* is somewhat variable in colour, ranging from dark to pale olive green. The head is symmetrically marked with black diverging lines or with thick black lines, more or less irregular in adults, or in very aged specimens perhaps wanting. The profile of the face is short. The mandible is armed inside with a median tubercle, hardly developed into a ridge, with a short ridge on either side springing from the inner edge of the jaw and invading for a short distance the masticatory area.

*Hab.*—The Ganges valley. Its occurrence east of the Bay of Bengal requires confirmation.

T. SEWAARE, Buch. Ham.

*T. sewaare*, Buch. Ham., Icon. ined. (*young*).

*T. sewaare*, Gray, A. & M. N. H. 1872, Vol. X, p. 336.

*T. chhim*, Buch. Ham. (*adult*) Icon. ined. (*Chim.*).



*T. chin*, Gray, Syn. Rep. 47, t. 10.

*T. aurum*, in part of Anderson, Gray, and other authors.

*T. Gangeticus*, Gray, Sup. Cat. S. R. p. 97, "3 half grown specimens."

*T. ocellatus*, in part of Gray, Anderson, Theobald, and other authors.

*T. Gangeticus*, Theobald or part P. A. S. B. 1874, p. 77.

This species is based on a figure of Buchanan Hamilton, which Gray in his paper on the mud-tortoises of India (A. & M. N. H. Vol. X, 1872, p. 336) thus describes—"The upper surface of the head uniform olive with a distinct yellow spot on each side of the crown." From these yellow spots on the temples this species was regarded by Dr. Anderson as '*ocellatus*' (= *hurum*), and by myself from the characters of its skull as a young *Gangeticus*. According to Dr. Gray (Mud-tortoises, l. c.) this species has either four or six ocelli and he figures its skull in the P. Z. S. for January, page 50. This skull, as I remarked in my previous paper, exactly resembles a skull I extracted from a spirit specimen in my own possession, which fairly agreed, as I then thought, with the figure of *ocellatus*. There are among the spirit specimens in the Indian museum very few young specimens in the *ocellatus* livery, and no prepared skulls, but among the former I found some possessing the abrupt outline of head as in *Gangeticus*, and others with the more tapering skull of typical *ocellatus*. It is thus clear that the species with outline of head of *Gangeticus* is not a mere phase of growth of *ocellatus*, and, although there are no specimens of very young *Gangeticus* here for comparison, it is certain from Gray's figures (P. Z. S. 1873, Pl. VIII), that the colouration is identical with that of larger individuals and wholly unlike Buchanan Hamilton's '*sewaare*,' which name will therefore stand.

Of this species very little is known, save that it differs from its nearest allied species, *ocellatus*, externally, by wanting the broad yellow band across the snout (though displaying the temporal blotches), and internally by its skull and shorter face, which has the profile seen in *Gangeticus*. Its sternal characters are not known, nor is the adult, unless the figure of '*chhim*' should be intended for it.

Among Buchanan Hamilton's drawings is a very beautiful one of a large *Trionyx* named '*chhim*,' which shows *two temporal patches* and *no band across the nose*, and this drawing, I have little doubt, represents the adult, but no profile view of the head is given, and it is wrongly identified by Gray (who would seem to have misspelt the name '*chin*') as '*hurum*' in Syn. Rep. tab. X. I prefer, however, adopting the name of the immature stage '*sewaare*,' as '*chhim*' (or '*sim*' as corruptly pronounced) is the name applied in Eastern Bengal to the *chitra*, and would perpetuate error.

There is some confusion here. General Hardwicke calls the '*chitra*' '*sewteree*'—a name I believe still applied to it along the Ganges ('*chhim*' or '*sim*' being used in Eastern Bengal), whilst Buchanan Hamilton terms it



'*Testudo chitra*' and applies the term '*chhim*' to a *Trionyx*. Now it seems to me very probable that this is a clerical error, and the names have been transposed, as *chitra*, which I presume is an etymological cousin of '*chittee*,' '*chitul*,' '*chitur*,' meaning spotted (a spotted snake, the spotted axis, the leopard), is very applicable to the adult figure of '*chhim*,' as is at once seen by reference to the original drawing. In this drawing the back is represented as a dark plumbeous olive, very rich and uniform, and profusely studded with small equidistant and equal lenticular spots of a paler colour with their long axes arranged longitudinally. The head is uniform, with two large ragged temporal blotches of a pale colour, but no pale band in front of the eyes. Be this as it may, '*chhim*' is the recognised vernacular name of the *chitra* and is therefore inapplicable and must be set aside in favour of Buchanan Hamilton's other name '*sewaare*.'

*Hab.*—The Ganges valley.

From the separation now effected of this *Trionyx*, uniting the colouration of '*ocellatus*' and the facial profile of *Gangeticus*, it follows that the true *ocellatus* with a conspicuous yellow band across the snout, is still available as a name for the species designated *hurum* by Anderson and *Buchanani* by myself.

T. OCELLATUS, Buch. Ham. (*young*) Anderson and Gray. Pl. IV.

*T. Buchanani*, Theob., P. A. S. B. 1874, p. 78.

*T. hurum*, Anderson, A. & M. N. H. 1872, Vol. IX, p. 382.

*T. sewaare*, Buch. Ham. apud Anderson, l. c.

*Kala'kachim* of the Bengali fishermen.

In his paper in the Annals l. c., Dr. Anderson does not discriminate, or even allude to the last described '*sewaare*,' though specimens in the museum were examined by him. They were not in the best state, but whether from this or from not discriminating them, he appears to refer them all to one species, *hurum* apud Anderson. From '*sewaare*' the present species is distinguished externally by a pale yellow band across the nose, in front of the eyes, which is absent in *sewaare*, and by a much greater development of the pale yellow blotch beneath the lower jaw on either side, which is slightly developed in '*sewaare*,' but forms a prominent band rising with a slight curve upwards towards the back of the neck in *ocellatus*. From *sewaare* it is also distinguished by the more elongate form of the anterior half of the skull, the profile of the face of *sewaare* being the same as in *Gangeticus*, and differing wholly from *ocellatus*, though the subspatulate symphysis of the mandible departs from the form of *Gangeticus* and resembles that of *ocellatus*.

For a comparison of the dermal characters there are no materials.

Dr. Anderson was clearly led to the identification of *ocellatus* and *hurum* by the fact that the figure of *hurum* displays four ocelli, which Dr. Anderson



argued were never seen in *Gangeticus*, but this view I consider Dr. Gray has entirely demolished, as I have already explained.

That the figure of *hurum* really represents one of the many varieties of *Gangeticus*, is rendered pretty certain, by the character of the black lines on the head, which in *ocellatus* or *sewaare* is uniform, or at most darker mottled, and not marked by thick lines, as in the figure of *hurum*, neither is there present the characteristic band across the snout, or the temporal blotches. The head of the specimen figured as *hurum* seems to have been a uniform and unusually pale yellowish colour or greenish yellow, but the style of marking by thick black lines decides it to belong to *Gangeticus*.

Skull and face of *ocellatus* more elongate than in *Gangeticus*. Mandible almost spatulate in front, with a well defined median groove or furrow (f. P. IV) inside. Young handsomely ocellated and the shell reticulately marbled with darker. A conspicuous yellow bar across the nose, and a large yellow spot on either temple, and a smaller one at the gape. General colour green, darker on the occiput, where it is mottled with paler. Throat and neck plumbeous white. Eyelids red (*fide* A. Anderson *in litt.*). Cartilaginous portion of carapace almost devoid of tubercles in half grown and adult specimens. Pittings of sternum coarser than in *Gangeticus*, and the abdominal plates more bent, I think, than in that species.

*Hab.*—The Ganges Valley. The specimen (figured one-third the natural size) was procured by Mr. A. Anderson, at Futtehghurh. The skull is figured of the natural size.

#### T. PHAYREI, Theobald. Pl. IV.

*T. Phayrei*, Theob., P. A. S. B. 1874, p. 75.

*T. cariniferus*, Gray (l. c.) Journ. Lin. Soc. Lond., Vol. X.

In my paper in the Proceedings (l. c.) I referred with doubt the present species to *T. cariniferus*, Gray, believing it to be identical with the figure in the Cat. S. R. p. 67, Pl. XXXII. As, however, the correctness of this surmise cannot well be verified and as *Phayrei* certainly differs from the specimens described under Gray's name, in the Sup. Cat. S. R. p. 101, and from the skull of *Aspilus cariniferus* figured on page 102, my name must stand for this species.

The colouration of the head of *Phayrei* is marked and peculiar. The head is pale coloured with elegant and symmetrical subreniform marblings of a darker colour, arranged regularly and occupying about an equal area with the ground colour whereon they are displayed. *T. cariniferus*, Gray, however, is described as being marked on the head and neck with white spots, in a fashion which the present species could display at no phase of its growth.

*Hab.*—Arakan, Pegu, and the Malayan Peninsula.



T. JAVANICUS, Geoff.

*T. Javanicus*, Geoff. in Siebold's F. J., Chelonia, tab. V, f. 6 (skull).

*J. stellatus*, Geoff., Theobald, P. A. S. B. 1874, Pl. III.

The sternal character of the species found at Maulmein, which I consider identical with that from Java, may be seen by reference to my former paper (l. c.), but till a comparison is made with Javan specimens, the identity of the two forms cannot be considered as established. The *T. Javanicus* of Gray and Günther is, of course, *T. Gangeticus*, as pointed out by Anderson.

*Hab.*—Tenasserim, Java, &c.

T. PEGUENSIS, Gray.

This species is as yet only known from the head of an adult in spirit, brought from Pegu by myself. Gray describes it as a "pale olive green minutely and closely punctulated with black. The upper lip, lower part of the sides of the head, sides of the neck, chin and throat uniform greyish white. The lower margin of the flap of the upper lip opaque white."

This species is no doubt not rare in Pegu, and it is very desirable to ascertain its sternal character and its colouration in a young state. A skeleton of probably this species exists in the Indian Museum, and another has been carried home by Dr. Anderson.

*Hab.*—Pegu.

T. GRAYII, n. sp., Pl. III.

The specimen which I have the pleasure of naming in honour of the veteran zoologist so recently lost to us, was forwarded to me by Dr. Hungerford from the neighbourhood of Thayet-myo. The head was dried, but, on moistening it, the colouration of the skin was seen closely to resemble that of *T. Phayrei*, which I at first concluded it to be. The sternal characters, however, indicated a totally different animal, as may be seen by referring to the accompanying plate, wherein the shell is figured one third of the natural size and the skull of the full size. The skull on extraction proved to be very similar to that of *T. Peguensis*, Gray, but the style of colouration of the head was so different from that of *Peguensis* that it clearly belonged to some other species. The sternum of *Peguensis* is not known, unless a skeleton in the Indian Museum may belong to it, but as I have no means of ascertaining the colouration of the head of this specimen, I cannot say to which species, *T. Peguensis* or the present one, it belongs. The mandible is furnished with a median ridge (r fig. III) inside, wherein it differs from *ocellatus*, which has a median mandibular furrow instead, all of which marks in turn serve to diagnose it from its nearest allies, *Phayrei*, *Peguensis*, and *ocellatus*.

*Hab.*—The Irawadi valley.



J. EPHIPPIMUM, n. s., Pl. V, Figs. a, b, c (shell slightly reduced).

This species is based on a young specimen forwarded to me dried, from Tenasserim. The head on soaking displayed many yellow spots, something like '*stellatus*,' but the profile of the skull is very different from the figure in the *Fauna Japonica* of that species, a copy of which I give for comparison. On the back of the shell was a transverse dark mark (b. fig. V.) like a saddle-shaped flap, not quite symmetrical on both sides. Though a young animal, no traces of *ocelli* were visible, and the peculiar saddle marking has not been noticed that I can find on any described species. The mark is not visible on the dried shell but becomes distinct on soaking the shell in water, and was no doubt conspicuous during life. Anterior odd bone of the thorax *smooth*. Disk profusely covered with granular tubercles (each tubercle being rough like a mignonnette seed) ranged in sub-parallel rows. Thorax considerably arched with a prominent vertebral ridge. Sternum very cartilaginous without any pitted bone whatever. The species approaches '*ornatus*,' but would seem to be distinguished by its colouration from that species, and from all others with the descriptions of which I am acquainted. Those who may be inclined to question the specific value of colouration in the young of this genus should remember the words of Dr. Gray, who remarks that the "colouring of the young animal forms one of the best characters of the species of the genus" (Sup. Cat. S. R. p. 103).

*Hab.*—Tenasserim.

I have quite failed to arrive at any satisfactory opinion, as to whether any of the species noticed in this paper should be referred to Gray's genus *Aspilus*—beyond the fact, that if the genus *Aspilus* really possesses only two linear callosities as stated, then none certainly belong to it that I am acquainted with, but I am inclined to doubt this character, partly from reasons stated before with respect to B. Hamilton's figure of *T. gatajhol*, and partly from the youth of so many of Dr. Gray's specimens, and the consequent probability that this character may have been partly due, where observed in some cases, to immaturity.

There is, however, one character which may be made to serve as the means of dividing this genus into sections, each possessing a fixed geographical range, and that is the character of the mandible, for in all the species from the eastern coast of the Bay of Bengal, the mandible is traversed inside, in front, by a sharply marked median ridge (r. Plate III), whilst in species from Hindustan, in place of this ridge there is either a smooth surface or a depression (f. Plate IV).

The members of either section may be briefly characterised as follows.



Section *A*.

*Mandible smooth in front inside, or traversed by a median furrow or depression.*

1. Head ornamented with radiating black lines in the young, and ocelli on the back. In aged individuals some thick black lines or markings, generally present. Colour a more or less lively olive green. Mandible smooth inside. T. GANGETICUS, Cuv.

2. Head ornamented with two conspicuous yellow temple patches and one across the snout. No black lines on the head, but more or less reticulate mottling. Ocelli in the young. Colour darker and more dusky than in *Gangeticus*. Mandible in front subspatulate with a deep central groove. Profile of head elongate (P. A. S. B. 1875, Pl. IV).

T. OCELLATUS, Buch. Ham.

3. Young ocellated and with the yellow temporal patches, but no band across the snout. Profile intermediate between *Gangeticus* and *ocellatus*. Mandible with a central internal groove. Adult (the presumed *T. Chim* of Buch. Ham.) brown, profusely spotted with paler.

T. SEWAARE, Buch. Ham.

All these three species inhabit the Ganges valley and perhaps other parts of Hindustan, but are not authentically known from east of the Bay of Bengal.

Section *B*.

*Mandible in front, traversed inside by a median ridge.*

4. Head regularly marbled with dark reniform spots. Osseous granulations on sternum sparingly developed, and only fully on animals of a large size. Young ocellated. (P. A. S. B. 1874, Pl. IV).

T. PHAYREI, Theob.

5. Head dark irregularly spotted somewhat as in the last. Osseous granulations on sternum well developed in young individuals. (P. A. S. B. 1875, Pl. III).

T. GRAYII, Theob.

6. Head very elongate profusely yellow-spotted. Osseous granulations on sternum well developed. (P. A. S. B. 1874, Pl. III).

T. STELLATUS, Schl.

7. Head uniform dusky grey, minutely punctulated with black.

T. PEGUENSIS, Gray.

8. Head sparingly and irregularly yellow-spotted. A dark saddle-shaped band across the back. No ocelli. Young only known. (P. A. S. B. 1875, Pl. V).

T. EPHIPPIMUM, Theob.



It has yet to be determined whether any of the species included in section *A* range east of the Bay of Bengal or any in section *B* into Hindustan ; also to which of the sections the other described Indo-Malayan species of *Trionyx* should be referred ; and additional particulars of all are still much wanted.

What, moreover, *Aspilus cariniferus*, Gray, from Puna really is I do not know, and should be much obliged to any one who would forward me soft turtles from that locality to settle the question.

P. S.—A very curious account of the habits of some of our river turtles, probably of the present family, was communicated to me by Lt. Col. Swiney, 24th M. N. I. This officer was one day preparing to fish in the Narbada, when he remarked a funeral procession directing its way to the spot he had selected for his work. Putting up his rod, he watched the affair, and was surprised soon to see numerous little black bodies in the river, which proved to be turtles hastening to the scene of operations. The creatures even had the boldness to leave the water and had to be kept off the body with sticks. The body was that of a poor man, so after slightly burning the face, it was pitched into the river and then it was a sight to see the race that took place between the turtles on shore and those in the water to get at it. The place in question was the ordinary burning ghât of the neighbouring villages, and these turtles were evidently exercising their vested rights in these funeral baked meats, and were really in so doing performing useful service.

Mr. Wood-Mason remarked that Mr. Theobald was in all probability quite right in assuming that the very young in all the three Gangetic species of *Trionyx* were ocellated, the very young of a multitude of closely-allied forms being often so similar as to be nearly, if not quite, indistinguishable from one another. Such cases were explicable on what had been called the "recapitulation hypothesis," according to which the remarkable series of changes which every individual in passing from its simplest to its completely adult form underwent were so many more or less complete repetitions of the forms which its ancestry had successively exhibited in bygone ages : to adopt Haeckel's formula "the development of the individual (*ontogeny*) was a brief and rapid recapitulation of that of the species (*phylogeny*)."

We might therefore feel confident that these young turtles in their ocellated livery showed us the colouration of the progenitor of the group. In conclusion, he alluded briefly to the possibility of forming, by a study of the development and of certain peculiarities in the adults of their living descendants, some idea of the colouration of many animals long extinct : for instance, from the existence of longitudinal stripes in the young of the wild pigs of India and Europe and from the tendency in the young of feral individuals



of domesticated races to re-assume this striped character, from the brilliantly-striped fœtus of the Asiatic and American tapirs, from the shoulder and leg-stripes of many horses and especially from the colouration of the Zebra,—it might with confidence be inferred that the numerous porcine, tapirine, and equine animals that had existed during the deposition of the older tertiary strata were conspicuously striped creatures.

3.—*Descriptions of new species of Marine Mollusca from the Indian Ocean.*—By G. and H. NEVILL.

(Abstract.)

The following species are described as new :—

*Ringicula abbreviata*.

Regularly striated throughout; whorls  $3\frac{1}{2}$ , spire peculiarly short; outer lip crenulated as in *R. Charon*, H., without any tubercle; columella with a broadly reflected, rugose callosity, with two teeth, parietal tooth large.

Long. 3, diam.  $2\frac{1}{2}$  mil. Ceylon.

*Drillia lucida*.

Smooth and glistening; white, irregularly marbled with pale brown; apex somewhat mamillate and sinistral; whorls  $8\frac{1}{2}$ , divided with a deep groove below the suture, longitudinally, distantly ribbed, last whorl only transversely striated at its base; columella smooth, sinus deep. Closely allied to Hind's *Olavatula quisqualis*.

Long. 8, diam. 3 mil. Persia, Andamans, Púrí.

*Mangelia fulvocincta*.

Attenuately fusiform; whorls 9, longitudinally varicosely ribbed, minutely and regularly transversely striated; white with a brown band below the suture; the lower portions of the last whorl, the outer lip and aperture are brown, as is also the columella; sinus obsolete, canal very short and truncate.

Long. 8, diam. 8 mil. Bombay, Ceylon, Púrí.

*Mangelia Fairbanki*.

Very close to Reeve's *hexagonalis*, but with more open canal, six denticulations on the outer lip, sharp transverse distant striæ throughout, only three on each whorl; leaden brown colour, stained a darker shade on the outer lip and on the columella.

Long. 6, diam. 2 mil. Bombay.



*Clathurella exquisita.*

Closely allied to Pease's *C. canaliculata*; differs by the absence of the brown line beneath the transverse white band, by the suture not being coloured brown, by the contracted last whorl, by the more prominent canal, and finally by its smaller size.

Long.  $9\frac{1}{2}$ , diam. 4 mil. Mauritius.

*Clathurella Smithi.*

Minute, angularly fusiform, attenuated; apex round, slightly sinistral; white, tinged with brown on columella and outer lip; whorls 7, acutely angled, depressly excavated near the suture, decussately keeled; columella twisted, sinus deep.

Long.  $3\frac{1}{2}$ , diam.  $1\frac{1}{2}$  mil. Persia.

*Clathurella perplexa.*

Resembles *Mangelia Fairbanki* in many respects; whorls 8, longitudinally broadly and somewhat convexly ribbed, transversely striated; ash colour, columella and outer lip brown; columella slightly twisted.

Long. 6, diam.  $2\frac{1}{2}$  mil. Bombay, Ceylon.

*Clathurella singularis.*

Elongate and fusiform, apex pointed; white, with a few obsolete brown markings on the last whorl; whorls 9, transversely regularly striated, longitudinally faintly and obtusely ribbed; columella straight and smooth, sinus deep and rounded; under the lens very minutely, regularly longitudinally striated. Allied to *Cithara Delacouriana* of Crosse.

Long.  $8\frac{1}{2}$ , diam.  $3\frac{1}{2}$  mil. Andamans.

*Clathurella Masoni.*

Ovately fusiform, white, peculiarly scalariform; six angular whorls, broader above than at their base, longitudinally strongly ribbed, transversely prominently, distantly striated; columella smooth, sinus very deep, aperture small and contracted. Allied to *Pl. scalata* of Souverbie.

Long. 4, diam. 2 mil. Andamans.

*Clathurella Martensi.*

Conically fusiform, dark brown with lilac granules; seven rounded whorls, distantly reticulated, with three rows of large granules where the ridges bisect one another; an excavated furrow towards the base of the last whorl; columella strongly twisted, of a lilac colour with a few denticulations at its edge; the aperture and denticulations within the outer lip are also lilac-coloured; sinus deep, outer lip abruptly contracted near its base, forming a strongly marked canal.

Long. 5, diam. 2 mil. Ceylon.



*Clathurella enginæformis.*

Convex, narrowly elongate, resembling certain species of *Engina*, peculiarly attenuated and contracted at base, spire pointed; white, with a single broad irregular yellow band; whorls seven, distantly reticulated, the interstices under the lens closely longitudinally striated, regular and rounded granules where the ridges bisect one another; sinus deep, but contracted; aperture very straight and narrow.

Long.  $5\frac{1}{2}$ , diam.  $2\frac{1}{2}$  mil. Ceylon.

*Clathurella contortula.*

Globosely conical, peculiarly bent, apex very obtuse, white; whorls six, longitudinally prominently ribbed, distantly transversely striated, imparting a granulose appearance to the ribs; columella peculiarly twisted, aperture narrowly contracted; allied to Reeve's *Pl. obtusa*.

Long.  $5\frac{1}{2}$ , diam.  $2\frac{1}{2}$  mil. Ceylon.

*Clathurella Blanfordi.*

Elongate, cylindrically ovate, apex sharp and pointed, deep violet-coloured throughout; whorls  $7\frac{1}{2}$ , longitudinally and transversely ribbed, ribs very prominent, of equal thickness, forming granules where they bisect one another; an excavated furrow near the base of the last whorl; sinus rather large, columella short and twisted, aperture moderately wide; contorted.

Long.  $5\frac{1}{2}$ , diam.  $2\frac{1}{2}$  mil. Annesley Bay, Red Sea.

*Clathurella Armstrongi.*

Pyramidically elongate, angular in the middle of the whorls, very pointed at base, apex sharp, uniform brown throughout; whorls 8, obtusely and distantly longitudinally ribbed, transversely striated; columella peculiarly twisted with a shining callosity which is rugosely granulated as in *Cythara*; aperture short and contorted, sinus remarkably deep. Allied to *Pl. arctata* of Reeve.

Long. 5, diam.  $2\frac{1}{2}$  mil. Andamans and Paumben Straits.

*Cythara gradata.*

Narrow, ovately oblong, apex very obtuse, pure white throughout; whorls six, reticulated; columella straight, slightly rugose; aperture contracted, sinus small, outer lip very thick, rounded.

Long.  $5\frac{1}{2}$ , diam. 2 mil. Ceylon, Bombay.

*Cythara dubiosa* (? *coniformis*, Gray).

Very closely allied to, if not the same as, Gray's *coniformis*; greater thickness, straighter outer lip, and less oblique longitudinal ribs seem to distinguish this form.

Long.  $7\frac{1}{2}$ , diam. 4 mil. Mauritius, Andamans.



*Cythara Isseli.*

Thick, ovately conical, apex pointed; white, orange banded in the middle of the whorls; whorls seven, reticulated; columella nearly straight, with a moderate callosity, closely rugose; aperture narrow, sinus moderate, outer lip thick, transversely striated.

A decollated specimen of 4 whorls only—Long.  $7\frac{1}{2}$ , diam. 4 mil. Ceylon.

Var. *Cernica.*

A perfect specimen—Long.  $6\frac{1}{2}$ , diam.  $2\frac{1}{2}$  mil. Mauritius.

*Nassa obesa.*

Thick, globosely conical, spire pointed; brown marbled indistinctly with white, stained near the suture dark brown, coloured exactly like Reeve's fig. of *N. mutabilis*, L.; whorls 10, longitudinally obliquely, thickly ribbed, ribs more or less obsolete on the back of the last whorl; transversely distantly grooved, some of the grooves more deeply incised than others, the upper ones form two rows of more or less granulose ridges beneath the suture. Allied to Reeve's *N. algida*.

Long. 22, diam.  $1\frac{1}{2}$  mil. Kutch.

Var. *Ceylanica.*

Smaller, more acuminate, less globose, with the suture more distinct; sculpture more obsolete.

Long. 19, diam. 10 mil. Ceylon, Penang.

*Columbella (Mitrella) balteata.*

Small, elongate, fusiform; spire about the same length as the last whorl; light reddish-brown, apex red, a single belt of dark red in the middle of the whorls between the ribs, these latter are indistinctly white spotted in their centre; whorls 7, longitudinally ribbed, transversely striated, grooved below the suture; columella simple and twisted, outer lip acute, slightly emarginate above.

Long. 5, diam.  $1\frac{1}{2}$  mil. Mauritius.

*Zafra polita.*

Slenderly fusiform, smooth, attenuated at both ends; spire contorted, nearly as long as the last whorl; white, with two bands of irregular opaque white flakes on each whorls; whorls six, striated at base of last whorl only; outer lip remarkably thick and bent in, making the aperture peculiarly contracted.

Long.  $3\frac{1}{2}$ , diam.  $1\frac{1}{2}$  mil. Mauritius.

*Zafra semisculpta.*

Turreted, narrowly lanceolate, apex pointed; spire a little longer than the last whorl; horny-brown throughout, whorls seven, longitudinally



thickly ribbed, ribs obsolete on the back of the last whorl, which is transversely striated at its base; columella with a sharply defined callosity, outer lip scarcely thickened, not as long as the columella; aperture very narrow.

Long. 3, diam. 1 mil. Burma.

*Sistrum ventricosulum*.

The smallest species known of the genus, very gibbous, ovately ventricose, thick, abruptly attenuated at base; spire short, acute, about  $\frac{1}{4}$  the size of the last whorl; white, stained with brown; whorls seven, with two rows of prominent pointed granules, the lower row the larger; canal long, not recurved; four tubercles within the aperture, the two upper ones very prominent; outer lip remarkably thickened, slightly emarginate above.

Long.  $5\frac{1}{2}$ , diam.  $3\frac{1}{2}$  mil. Ceylon.

*Eulima acuformis*.

Very elongate, sharply pointed, flexuous; whorls 17, cylindrical, slightly angulate at their base, except the last whorl which is short and rounded; varices obliquely continuous. Allied to *E. lactea* and *flexuosa* of A. Adams.

Long. 10, diam.  $2\frac{1}{2}$  mil. Andamans.

*Rissoina (?) abnormis*.

Small, thick, shortly fusiform, white; apex remarkably truncately sinistral; whorls six, longitudinally ribbed, more or less obsolete towards the base of the last whorl, throughout transversely closely and rugosely striated; columella strongly twisted at base, covered with a moderate callosity; aperture small, peculiarly deeply channeled at base; outer lip produced and rounded, very thick, transversely striated, crenulated at the margin.

Long. 3, diam.  $1\frac{1}{2}$  mil. Mauritius.

*Cyclostrema eburnea*.

Depressly orbicular, thick; whorls five, sharply angled below their centre, longitudinally obliquely plicated, obsoletely granulated at the angulation, interstices very closely transversely striated; a remarkable very prominent, thick keel at the periphery, sculptured like the whorls;  $\frac{2}{3}$  of the base also sculptured as above, smooth on the remaining  $\frac{1}{3}$  round the umbilicus; umbilicus moderate, partially covered by the thickened columella. Allied to Maryatt's *C. cancellata*.

Alt.  $2\frac{1}{2}$ , diam.  $4\frac{1}{2}$  mil. Púrí.

The following synonyms are also recorded:

*Columbella lactescens*, Souv. = *Columbella pardalina*, Lam. var.

*Murex Crosseana*, Lien. = *Latirus gibbus*, Pease.



*Murex Lienardi*, Crosse. = *Sistrum fiscellum*, Ch. var.

*Mitra Antoniae*, H. Ad. = *Mitra pretiosa*, Rv.

*Mitra amanda*, Rv. = *Mitra cruentata*, Ch. var.

*Ringicula minuta*, H. Ad. = *Ringicula acuta*, Phil. var.

*Euchelus Lamberti*, Souv. = *Tallorbis roseola*, Nev.

*Clanculus Tonnerrei*, Nev. = *Trochus Satrapius*, v. M.

*Minolia variabilis*, H. Ad. = *Gibbula Holdsworthana*, Nev. var.

The genus *BACULA*, H. and A. Ad. = *ARCUELLA*, Nev.

Finally, *Marginella Isseli* is suggested for *M. pygmæa*, Issel, not of Sow-erby; and *Clathurella Peasei*, Nev. for *Cl. canaliculata* of Pease, not of Reeve.

The paper will be published in full in the forthcoming number of Journal Part II, with illustrations.

4.—*The evidence of past Glacial Action in the Nágá Hills, Assam.*—By Major H. H. GODWIN-AUSTEN, F. R. G. S., F. L. S., &c.

(Abstract.)

In this paper the author points out that on so low a latitude as 25° 30' N. glaciers of considerable size must have once filled the valleys of the Burraill Range. The moraines observed are to be seen under the highest part of the Burraill, where it attains an elevation of 9,890 ft. The thick deposits of boulders and clay in the upper sources of the Barák were also attributed to the greater size of the river during the same period.

Mr. W. T. Blanford remarked that at the time when glaciers existed in the Burraill, that range was probably much higher than now, but since reduced by the effects of denudation.

The paper will be published, with illustrations, in Part II of the Journal.

5.—*Photography in connection with the Observation of the Transit of Venus at Roorkee, December 9th, 1874.*—By Capt. J. WATERHOUSE, Asst. Surveyor General of India.

(Abstract.)

The author, after briefly stating the object of photographic observation of the Transit, gives an account of the experiments undertaken to find a suitable dry process and states the formula for the coffee-albumen process with which the best results were obtained. The instruments used and the photographic arrangements of the observatory and dark-rooms are described. The reasons for discarding the dry process and adopting the wet are stated and an account given of the operations on the day of the Transit. In conclusion, suggestions are made with regard to the photographic observation of the Transit of 1882.



The paper was illustrated by a copy of one of the six-inch photographs taken and a Janssen plate. The Janssen slide was also exhibited and its construction explained.

The paper will be published in Part II. of the Journal.

- 6.—*List of Mammalia collected by the late Dr. Stoliczka, when attached to the Embassy under Sir D. Forsyth in Kashmir, Ladak, Kashgar, and Wakhan, with descriptions of new species.*—By W. T. BLANFORD, F. R. S., F. Z. S.

(Abstract.)

In this paper the author describes some new mammalia, principally rodents, from the collections made by the late Dr. Stoliczka when accompanying the mission under Sir D. Forsyth to Yarkand and Kashgar. He especially called attention to the large number of species of hares and pikas or tailless hares which had been obtained; no less than five of the former, of which four appeared to be new, and three of the latter, of which two were new, were represented in the collection. There was also a new marmot from the Kashkasu pass, between Yarkand and the Pamir.

The paper will be published in Part II. of the Journal.

- 7.—*On the species of Marmot inhabiting the Himalayas and Thibet.*—By W. T. BLANFORD, F. R. S., F. Z. S.

In this paper the author notices the different species of Himalayan and Tibetan marmots, of which he recognised five, including the new species, viz. *Arctomys himalayanus*, *A. hemachalanus*, *A. robustus*, *A. caudatus*, and *A. aureus* sp. nov. He believed that *A. himalayanus* was not the same as the European *A. bobac*, although naturalists had united them.

The paper will be published in Part II. of the Journal.

At the close of the meeting Mr. Schwendler exhibited a four horned sheep presented to him by Sir William Merewether. The animal comes from the Province of Sibi, Afghanistan territory. Sir William Merewether states that he has seen several of these four-horned sheep, that they all came from the same locality, and were most likely a breed. Mr. Schwendler said that the large size and beautiful form of the animal, as well as the beautiful wool it produced, would seem to make it advisable to breed from. He had announced to the natives in his neighbourhood that they would be allowed to send their sheep for breeding purposes, but none of them had responded, although they were told that no expense would be incurred thereby. It appeared to him that the natives of India as a general rule did not take that interest in the improvement by selection of their



domestic breeds that they ought to do, and that had been taken for the last fifty years, with such decided and practical results in Europe,—that there was much room for the improvement of domestic animals in India nobody could doubt.

Dr. McLeod apprehended that objects were brought before this learned Society not for the mere sake of exciting curiosity, but as a contribution to scientific knowledge or illustration of scientific doctrine. He would, therefore, be glad to learn from Mr. Schwendler whether he had any explanation to offer regarding the peculiarity which this sheep presented. Every departure from the normal type of development must be either a reversion, a variation, or a monstrosity, and these were capable of being brought into relation with similar facts. Was this sheep a reversion to some ancestral type, such as the turtles and horses which Mr. Wood-Mason had spoken of, or was the duplication of the animal's horns an aberration of development similar to the duplication of thumbs—sometimes symmetrical, sometimes asymmetrical and occasionally hereditary—which we sometimes met with in the human subject? Tegumentary appendages were perhaps more liable to variation than any other structure, and authentic cases were on record of horns growing from the human skin—the skin of the scalp especially; he had seen specimens of this kind in museums and once removed a horn, three inches long, from the chest of a native of the district of Jessore. Excessive developments of hair on the human subject belonged to the same class of phenomena. Not long ago he had read in the newspapers of a hairy family in Burmah in which this peculiarity appeared to be hereditary, and had seen drawings of similar cases in Edinburgh. Could Mr. Schwendler give any facts to show whether the duplication of horns in this animal was a reversion, a variation, or a monstrosity?

Mr. Schwendler said that he could not answer Dr. McLeod's question. He had formed no theory, since he was not sufficiently acquainted with the history of the animal. His object had merely been to exhibit an interesting and beautiful animal not easily to be met with at Calcutta, and to draw attention to the desirability of breeding from it. His own belief was, that it represented a local breed produced by artificial selection, on account of these four-horned animals being so very handsome, and most likely also to possess other superior qualities. Mr. Schwendler said it was well-known that there existed a four-horned antelope in India, but did not think that any reasons had been assigned for this strange duplication of horns. There were undoubtedly reasons for everything nature had produced, but he himself could not attempt to answer such difficult questions. That the four-horned sheep was not an individual accident or monstrosity seemed to be however certain, since many more sheep of the same kind were to be found in the same locality.



Major Godwin-Austen said that when in Kishtwár and Budráwar he had noticed that four-horned rams were rather common and in the larger flocks one or two would be seen; he had purchased one with very symmetrical horns, which he had kept for a long time. However, in most of them the horns were very crooked and badly set on. The people evidently kept these accidental varieties, looking on them as curiosities, and asking a longer price for them. He had never come across this kind of "sport" in any other part of the Kashmir Himalaya: it seemed a local peculiarity fostered by the retention of these males.

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## LIBRARY.

The following additions have been made to the Library since the Meeting held in July last.

*Presentations.*

\*.\* Names of Donors in Capitals.

Proceedings of the Royal Society, Vol. XXIII, No. 161.

*W. Crookes*.—On Attraction and Repulsion resulting from Radiation, Pt. II.—*J. B. N. Hennessey*.—Some Particulars of the Transit of Venus across the Sun, 1874, Dec. 9, observed on the Himalaya Mountains, Mussoorie. *W. H. Cripps*.—On a Continuous Self-registering Thermometer. *D. Ferrier*.—Experiments on the Brain of Monkeys.

ROYAL SOCIETY, LONDON.

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GEOLOGICAL SOCIETY, LONDON.

Proceedings of the Royal Geographical Society, Vol. XIX, No. IV.

*Coryton*.—Trade Routes between British Burmah and Western China.

ROYAL GEOGRAPHICAL SOCIETY, LONDON.

Proceedings of the Institution of Mechanical Engineers. January, 1875.

*H. Faija*.—On the Manufacture and Testing of Portland Cement, and the Machinery used in its production.

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*H. Clarke*.—Report on the Congress of Orientalists. *M. J. Walhouse*.—Account of a Leaf-wearing Tribe in India. *P. Harrison*.—Note on Phœnician Characters from Sumatra. *Col. A. L. Fox*.—Early Modes of Navigation.

ANTHROPOLOGICAL INSTITUTE OF GREAT BRITAIN AND IRELAND.

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*R. L. J. Ellery*.—Suggestions for the Construction and Erection of Lightning Conductors.

ROYAL SOCIETY OF VICTORIA.

Jahrbücher der K. K. Central-Anstalt für Meteorologie und Erdmagnetismus, von Carl Jelinek und Ferd Osnaghi. Neue Folge, X Band. 1873. IMPERIAL CENTRAL METEOROLOGICAL AND MAGNETIC INSTITUTE, VIENNA.



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*Bigrel.*—Note sur une carte générale de la Cochinchine Française.

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Journal Asiatique, Paris, 7<sup>me</sup> Série, Tom. V, No. 2. Fev., Mars, Avril, 1875.

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Bulletin de la Société Impériale des Naturalistes de Moscou, No. 3, 1874.

IMPERIAL SOCIETY OF NATURALISTS, MOSCOW.

The Third Annual Report of the Board of Managers of the Zoological Society of Philadelphia, for 1874-75.

ZOOLOGICAL SOCIETY OF PHILADELPHIA.

Proceedings of the Academy of Natural Sciences of Philadelphia, U. S. Parts I. II. III. 1874.

THE ACADEMY.

Proceedings of the Boston Society of Natural History, Vol. XV, Pts. III and IV, 1873, and Vol. XVI, Pts. I and II, 1873-74.

Vol. XVI, Pt. II. *F. W. Putnam.*—Notes on the Genus *Myzine*. Notes on *Bdellostoma*. *A. S. Packard, Jr.*—Transformation of the Common House Fly. *A. Murray.*—Notice of a Gigantic Squid.

Memoirs of the Boston Society of Natural History, Vol. II. Part II. No. IV, and Part III, Nos. I and II.

Part III. No. 1. *E. S. Morse.*—Embryology of *Terebratulina*.

BOSTON SOCIETY OF NATURAL HISTORY.

Annual Report of the Board of Regents of the Smithsonian Institute for 1872. Smithsonian Miscellaneous Collections, Vols. XI and XII, 1874.

Vol. XI. *Th. Gill.*—Arrangements of the Families of Mammals, with analytical tables. Arrangement of the Families of Fishes, or Classes *Pisces*, *Marsipobranchii*, and *Leptocardi*. *A. S. Packard.*—Directions for Collecting and Preserving Insects.

Vol. XII. *F. W. Clarke.*—The Constants of Nature. Pt. I. Specific Gravities; Boiling and Melting Points; and Chemical Formulæ. *Prof. J. Henry.*—Telegraphic Announcements of Astronomical Discoveries.

Smithsonian Contributions to Knowledge, Vol. XIX.

*Brevet Major-General, J. G. Barnard.*—Problems of Rotary Motion presented by the Gyroscope, the Precession of the Equinoxes and the Pendulum. *S. Newcome.*—An Investigation of the Orbit of Uranus, with General Tables of its Motion.

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The Complete Works of Count Rumford, Vol. III.

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Report of the Commissioner of Agriculture for the year 1872.

Microscopic investigations. Influenza in Horses. Fish Culture. Silk-cultivation. City Milk-supply. Progress of Industrial Education.

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Annual Report of the Trustees of the Museum of Comparative Zoology at Harvard College, in Cambridge, for 1873.

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Observations on the Genus *Unio*, Vol. XIII, with an Index to Vols. I to XIII, by Isaac Lea, LL. D.

AUTHOR.

Notes on the Avifauna of the Aleutian Islands. Notes on Pre-Historic Remains in the Aleutian Islands. Catalogue of Shells from Bering Strait, and the adjacent portions of the Arctic Ocean, with descriptions of three new species. On Further Examinations of the Amaknak Cave, Captains Bay, Unalashka. On New Parasitic *Crustacea*, from the N. W. Coast, of America. Notes on some Tertiary Fossils from the California Coast, with a List of the species obtained from a Well at San Diego, California, with Descriptions of two New Species. Preliminary Descriptions of New Species of *Mollusca* from the Coast of Alaska, with notes on some rare forms, by W. H. Dall. U. S. Coast Survey.

AUTHOR.

On the Andamans and Andamanese. Notes on the Respiration of some species of Indian Freshwater Fishes, by G. E. Dobson, B. A., M. B.

AUTHOR.

Results of Meteorological Observations for 1874, taken at G. V. Juggarow's Observatory, Daba Gardens, Vizagapatam, by A. V. Nursingrow.

AUTHOR.



The Life or Legend of Gaudama, the Budha of the Burmese, by the Rev. P. Bigandet.

MAJOR G. E. FRYER.

The Calcutta Journal of Medicine, Nos. 2 to 6, Feb. to June, 1871, edited by Mahendra Lal Sircár, M. D.

EDITOR.

Professional Papers on Indian Engineering. Second Series. Vol. IV, No. 17, July 1875, edited by Major A. M. Lang, R. E.

A. O. Green. Borate of Lime Glaze for Tiles. Mountain Railway from the Nilgiri Hills. Memorandum on the removal of Obstructions in the Mahanuddy and Bhagiruthes.

EDITOR.

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EDITOR.

Catalogue of Sanskrit MSS. existing in Oudh, discovered from 1st October, to 31st December, 1874, and Catalogue of Sanskrit MSS. existing in Oudh, Fasciculus VI. prepared by J. C. Nesfield, M. A. edited by Rajendralála Mitra.

DIRECTOR OF PUBLIC INSTRUCTION, OUDH.

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EDITOR.

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Report on the Nágpur School of Medicine, Central Provinces for the year 1874.

Report on the Working of the Government Charitable Dispensaries in the Central Provinces for the year 1874.

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#### *Purchase.*

The Annals and Magazine of Natural History, Vol. 15, No. 90, June 1875.

T. Higgin.—On two Hexactinellid Sponges from the Philippine Islands, in the Liverpool Free Museum. F. P. Pascoe.—Descriptions of some new Asiatic Species of Rhynchites. Arthur Viscount Walden.—Descriptions of some undescribed Species of Birds discovered by Lieut. W. Ramsay in Burma. E. A. Smith.—A list of the Gasteropoda collected in Japanese Seas by Commander H. C. St. John, R. N.



The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science, Vol. 49, No. 327. June, 1875.

No. 327. *F. Kohlrausch and O. Grotrian*.—On the Electric Conducting-power of the Chlorides of the Alkalies, Alkaline Earths, and Nitric Acid in Aqueous Solutions. *A. M. Mayer*.—Researches in Acoustics. *G. C. Foster and O. J. Lodge*.—On the flow of Electricity in a uniform plane conducting Surface.

Journal of the Society of Arts, Vol. XXIII, Nos. 1173 to 1176.

No. 1173. *J. Hogg*.—River Pollution with Special Reference to the Impure water supply of Towns.

No. 1174. *C. R. Markham*.—The Agricultural Statistics of India.

No. 1175. *A. Nobel*.—On Modern Blasting Agents.

No. 1176. Growth and Uses of Indian Sandal-Wood; Agricultural Statistics of India.

Reeve's Conchologia Iconica, Pts. 320, 321, containing *Solemya*, *Mya*, *Clausilia*, *Cylindrella*.

Sowerby's Thesaurus Conchyliorum, Pts. XXXI and XXXII, containing a Monograph of the genus *Mitra*.

The Indian Medical Gazette, Vol. X, No. 8, August, 1875.

The Academy, Nos. 162 to 166. June, July, 1875.

Poggendorf's Annalen der Physik und Chemie, Vol. 155, 1875. Nos. 5 and 6.

No. 6. *C. Neumann*.—Ueber die gegen das Weber'sche Gesetz erhobenen Einwände.—*R. Bunsen*.—Spectral-analytische Untersuchungen. *W. Siemens*.—Beiträge zur Theorie der Legung und Untersuchung submariner Telegraphenleitungen. *C. Fromme*.—Untersuchungen über den Magnetismus von Stahlstäben.

Gottingische Gelehrte Anzeigen, Nos. 17 and 18, mit Nachrichten, No. 11, 1875.

No. 17. *H. L. Fleischer's* Grammatik der lebenden Persischen Sprache. Nach *Mirza Mohammed Ibrahim's* Grammar of the Persian Language.

Revue Archéologique, No. 5, Mai, 1875.

Revue Critique, Nos. 19 to 22, Mai, 1875.

No. 19. Recherches Orientales, p. p. *Derenbourg*, *Ethé*, *Loth*, *Müller*, *Philippi*, *Stade*, et *Thorbecke*.

No. 20. *De Goeje*, Le Divdn de Moslim.

Journal des Savants, April, 1875.

Comptes Rendus, Vol. LXXX, Nos. 17 to 20, May, 1875.

No. 17. *M. G. Planté*.—Recherches sur les phénomènes produits dans les liquides par des courants électriques de haute tension.—*M. Z. Pupier*. Action des alcalins sur la composition du sang. Recherches expérimentales sur la prétendue anémie alcaline. *M. Rabuteau*.—De l'action du fer sur la nutrition. *M. Heckel*.—De l'action de quelques composés sur la germination des graines (bromure de camphre, borate, silicate et arséniate de soude.)



No. 18. *M. Faye*.—Lettre sur la distribution de la température à la surface du Soleil et les récentes mesures de *M. Langley*. *M. Peslin*.—Théorie des tempêtes. Réponse à *M. Faye*.

No. 19. *M. Müntz*.—L'action du chloroforme sur les ferments chimiques et physiologiques. *M. de Tastes*.—Note sur la théorie des cyclones.

No. 20. *M. Faye*.—Quelques remarques sur la discussion au sujet des cyclones. *L. P. Secchi*.—Etude des taches et des protubérances solaires de 1871 à 1875. *M. L. de Wecker*.—Sur un nouveau procédé opératoire de la cataracte (extraction à lambeau périphérique).

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Fas. 2. *F. de Saulcy*.—Lettres à *M. Chabas* sur quelques points de la géographie antique de la Palestine.

Revue des Deux Mondes, Vol. 9, Nos. 2 and 3, May and June, 1875.

May. *M. B. Radau*.—Le rôle des vents dans les climats chauds.

June. *M. I. Clavé*.—Etude de météorologie forestière.

The Jataka, together with its Commentary, being Tales of the Anterior Births of Gotama Buddha, by *V. Fausbøll*, translated by *R. C. Childers*. Text Vol. I, Part I.

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Histoire des Mogols et des Tatares, par *Aboul-Ghâzi Béhâdour Khan*, edited and translated by *Baron Desmaisons*. Vols. 1 and 2. Text and Translation.

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The Dvaidhārāya (continued). *Rāmchandra G. Anjal*.—The Gīrnār Māhātmya. *Prof. Weber*.—On the Yavanas, Mahābhāshya, Rāmāyana and Krishṇajānmashtami. Coins.

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Map of Western Mongolia, illustrating the Explorations of *Miroshnichenko* and other Russian Travellers. *Capt. Napier's Travels in Northern Persia*. Recent Russian Explorations in Western Mongolia.

Nature, Nos. 293 to 296, Vol. 12, June and July, 1875.





PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR NOVEMBER, 1875.

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The monthly General Meeting of the Society was held on Wednesday the 3rd November, at 9 o'clock P. M.

T. Oldham, LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were announced—

1. From Bábu Mohini Mohan Roy, Pleader, High Court, two silver coins.

Mr. Blochmann said—

The two silver coins presented to the Society by Bábu Mohini Mohan Roy, were struck by Nusrat Sháh, king of Bengal. The two coins have no year nor mint-town, the margin having been cut away, the reverses being defaced by shroff marks; but they are of a new variety.

The coins were found in the Sundarban, in lot No. 46, Ahad Darya, about 21 miles east of Calcutta, and were in a cockle shell about a foot and a half below the ground.

2. From Capt. W. J. Williamson, Deputy Commissioner, Garo Hills, two silver coins.

Mr. Blochmann said—

Of the two silver coins presented to the Society by Capt. Williamson, one is a rupee struck by Dáúd Sháh, the last independent king of Bengal. The other is a unique silver coin struck by Nara Náráyana, the second Mahárájá of Koch Bihár, in Sáka 1477, or A. D. 1555. A figure of the coin has been given in Journal, Pt. I, No. III, for 1875, p. 306.

3. From S. Kurz, Esq., a coin called Lapeck (6000 = 1 dollar) from Cochin China.

4. From the Author, Capt. H. Trotter, R. E., a copy of an "Account of the Survey Operations in Eastern Turkistan, 1873-74."

5. From the Govt. of the N. W. Provinces, photographs of the Ancient Temples at Barwa Ságar, Barauli, in the Jhání district, and of Muhammadan buildings at Badáon and Kol.



6. From the Batavian Society of Arts and Sciences, a copy of a work entitled *Bôrô-Boudour*, by Dr. C. Leemans, together with photographs, and lithographs illustrating the work.

The President proposed and it was carried unanimously that the special thanks of the meeting should be given to the Batavian Society for this very magnificent and valuable donation.

7. From the Author, Dr. J. Fayrer, a copy of "*The Royal Tiger of Bengal, his life and death.*"

8. From the Author, Rev. K. M. Banerjea, a copy of "*Rig-Veda Sanhita.*"

9. From the Author, M. le Comte de Croizier, a copy of a work entitled "*L'Art Khmer.*"

10. From the Author, Mr. J. Beames, a copy of "*A Comparative Grammar of the Modern Aryan Languages of India,*" Vol. II.

11. From Mr. W. T. Blanford, a copy of a work entitled—"The Countess of Chinchon and the Chinchona genus," by C. Markham.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members—

S. S. Jones, Esq., C. S.

R. G. Thomson, Esq., C. S.

Dr. Böhtlingk of Jena, and Prof. J. O. Westwood of Oxford, proposed by the Council at the last Meeting as Honorary Members, were duly elected.

The following gentleman is a candidate for ballot at the next meeting—

J. B. Knight, Esq., Calcutta, proposed by Dr. Oldham, seconded by Dr. Waller.

The following gentlemen have intimated their desire to withdraw from the Society—

Dr. V. F. Bellew.

Capt. J. C. Ross, R. E.

G. T. Peppé, Esq.

Bábu Gobindo Kumar Chaudri.

R. Knight, Esq.

The President announced that the Council recommend the appointment of the Rev. J. D. Bate, Allahabad, and Maulavi Abdul Hai, Calcutta, as Associate Members of the Society, in recognition of the services they have rendered to Oriental literature, the former by the publication of his *Hindi Dictionary*, the latter by his editions of several works in the *Bibliotheca Indica*.



The President also announced that the Council had appointed Mr. C. H. Wood a member of the Physical Science and Library Committees.

Mr. Wood-Mason exhibited specimens of a gigantic spider belonging to the genus *Mygale*, which had the power of emitting a loud stridulating sound, and stated that that interesting discovery had been made by Mr. S. E. Peal of Sibságar, who, at his request, had drawn up a most graphic account of his observations on the living animal. Mr. Mason had himself undertaken to ascertain the position, and to describe the structure of, the sound-producing apparatus, which he had found to consist of a *comb*, composed of a number of highly elastic and indurated chitinous rods, situated on the inner face of the so-called *maxillæ*, and of a *scraper* formed by an irregular row of sharp spines on the outer surface of the *chelicerae*. This apparatus was equally well-developed in both sexes, as in most coleopterous insects, and was not confined to the males as in the *Orthoptera*, *Homoptera*, and the stridulating spiders (*Theridion*) observed by Westring, in all of which the exclusive purpose of the sounds emitted seemed to be to charm or call the opposite sex.

In conclusion, Mr. Mason discussed the probable purposes of the sound emitted, and pointed out how the *Mygale stridulans*, as he proposed to call the species observed by Mr. Peal, differed from its nearest ally *M. Javanensis*, in which no stridulating organs were developed. A full account would shortly be published in the Society's Journal.

Mr. W. T. Blanford exhibited several skins of Mammalia collected by Mr. L. Mandelli, of Darjiling, and stated that he had asked for the loan of some specimens of Tibetan mammalia to compare with those collected by Dr. Stoliczka in Ladák, and that Mr. Mandelli, with the greatest liberality, had sent the whole of his collection for examination, and presented the duplicates to the Indian Museum. That gentleman had also presented to the Museum a very fine pair of skins of the Tibetan Stag, *Cervus affinis*. Although a skin of this stag was once procured by Dr. Campbell, nothing so fine as the specimens now exhibited, it was believed, had been previously obtained.

The other skins brought to the notice of the meeting were merely a very small selection of the whole series sent, which comprised representatives of more than 50 species. Those exhibited consisted of the following species:—*Crossopus Himalaicus*, *Nectogale elegans*, *Felis Moormensis*, *Prionodon pardicolor*, *Urva cancrivora*, *Ailurus fulgens*, a fine series of squirrels including *Pteromys magnificus*, *Sciuropterus caniceps*, *S. alboniger*, *S. villosus*, and a species not hitherto identified, *Sciurus macruroides*, *S. lokriah*, *S. lokrioides*, and *S. Maccelellandi*, also *Lepus pallipes* and *Lagomys Curzonæ*.



A black squirrel which was amongst the collections, although so finely coloured that it had all the appearance of being a distinct species, was probably a melanoid individual of *S. lokriah* or *S. lokrioides*, whilst a dark brown cat's skin had probably belonged to a very dark form of *Felis Moormensis*. This skin was brown, with a distinct black stripe down the back, and with the lower part of the tail whitish, as in *F. Moormensis*. The normal skins of *F. Moormensis* agreed well with the plate of *F. aurata* in the Proceedings of the Zoological Society for 1873, but differed much from a specimen from the Malayan peninsula in the Indian Museum.

The hare sent was probably the true *L. pallipes*, as it agreed well with the description, and it shewed that the species collected at Changchenmo in Ladák by Dr. Stoliczka, which Mr. Blanford had on a previous occasion referred with doubt to *L. pallipes* (J. A. S. B. 1875, p. 109), was distinct.

The most interesting mammals exhibited, however, were two water-shrews. One of these, *Crossopus Himalaicus*, had been long known as an inhabitant of the Himalayas and had lately been referred by Dr. Anderson to the genus *Crociodura*, on account of its dentition. Dr. Anderson, however, had overlooked the circumstance that the genus *Crossopus* was founded on external characters, and the present species must either be classed with *C. fodiens*, or made the type of a new genus. Prof. Milne-Edwards had lately re-classified the shrews and had proposed a separate subfamily for the aquatic forms, which subfamily included *Crossopus*, and some Asiatic and American types. One of these types, *Nectogale elegans*, a new genus and species, was described at the same time by Prof. Milne-Edwards from the collections brought by the Abbé David from Moupin in Eastern Tibet. One of the skins obtained by Mr. Mandelli evidently belonged to this species. Mr. Blanford said that he once saw a small mammal, which he was unable to secure, in a stream at a considerable elevation (about 15000 feet) in Sikkim, and he thought it probable that this was the *Nectogale elegans*. The species had broad palmated feet, with a row of bristles round the margin, and furnished beneath with sucker-like disks; the tail was strong with rows of stiff hairs down the lower surface and along each side, it was flattened towards the end and near the extremity had a row of white hairs along its upper surface. The colour of the animal was dull black with whitish glistening longer hairs scattered amongst the fur. A few similar hairs were to be seen on the lower back of *Crossopus Himalaicus* but they were fewer and less conspicuous.

This animal, if, as appeared in every way probable, it had been obtained in Sikkim, was a most interesting addition to the fauna of the country.

Capt. Waterhouse exhibited photographs on glass of the solar spectrum showing the extreme red rays, and read the following note regarding them.



While recently making some investigations on Dr. Vogel's interesting and valuable discovery of the effect of certain dyes in increasing the sensibility to the less refrangible rays of the spectrum, of dry collodion plates prepared with pure bromide of silver, I observed on several of the plates a reversed action in the part of the plate acted on by the red rays, so that the Fraunhofer lines in that region, which should appear light on a dark ground, came out dark on a light ground, and on some few occasions distinct traces of lines in the extreme red below A were also visible. This effect was most marked on the plates stained with a blue dye, one of the aniline or an analogous series, obtained in the bazar, but was also perceptible on plates stained with orange, red and green dyes. These plates were all slightly fogged, but as the reversed lines were not observed on plates prepared with uncoloured bromide, I attributed the cause to the action of the dyes alone.

On repeating the experiments on this action of the blue dye with another series of plates, prepared after the nitrate of silver bath had been purified so as to give plates entirely free from fog, I was rather surprised to find that the reversed action was no longer obtained. On thinking over the subject it came to my recollection that in the early days of photography, when the daguerreotype was in vogue, Sir J. Herschel, Dr. Draper, Messrs. Claudet, Fizeau, Becquerel and other eminent daguerreotypists had observed that if a sensitive plate were exposed to the spectrum after a short preliminary exposure to diffused daylight, the red rays exercised a negative effect by which the action of the white light was neutralised, and in this manner photographs had been obtained in which not only the rays in the extreme red just below the ordinarily visible spectrum could be distinctly seen, but also traces obtained of three or four groups of rays in the heat spectrum where it was ordinarily supposed no photographic action existed.

I therefore tried the effect of a short preliminary exposure to daylight with one of the blue-stained bromide plates prepared at the same time and in the same manner as the one on which no reversed action was apparent. On developing, the reversed action was well marked, as I had expected, and not only were the A and other lines in the red and yellow clearly to be seen as dark lines on a transparent ground, but the bands and lines in the extreme red below A were also distinctly visible and reversed, as will be seen in the two negatives I have the pleasure to exhibit this evening. One of them was taken with a very fine single-prism spectroscope kindly lent me by Mr. Pedler of the Presidency College and shows several images of spectra in which the lines in the extreme red are fairly distinct though faint. The other was taken with a Browning's direct-vision spectroscope, and on this plate the bleaching action is particularly well shown, not a trace of deposit remaining on a great part of the plate acted on by the red rays,



while the lines stand out clearly, though not in very good definition owing to my having used a rather large opening of the slit.

It will be observed also that the part of the spectrum acted upon by the blue and violet rays is also reversed, so that the whole spectrum is reversed from a little above  $H_2$  to below A. This action I have noticed on all dry bromide plates, both stained and unstained, and have frequently obtained very beautiful images of the lines between  $H_2$  and F on a perfectly clear ground. The effect appears to be chiefly caused by overexposure and may perhaps be partly due to the action of the alkaline developer.

As above stated, the reversing action of the red rays has been observed with daguerreotype plates and therefore I cannot claim to have made a discovery, but so far as I am aware the application of the principle to collodion photography is entirely new, and as it appears capable of an important practical application in spectroscopic photography, particularly in extending our knowledge of a part of the spectrum in which eye-observations can only be made with difficulty and under very favourable circumstances, I have thought it worth bringing to the notice of the Society and hope to be able to continue the investigations with still better results.

Capt. Waterhouse further remarked that these photographs had an additional interest from the fact that the lines in the extreme red had hitherto only been observed about sunrise and sunset and that according to Mr. J. B. N. Hennessey, who had made a very careful study of them at Mussoree in 1870, complete darkness prevailed at sun-high in the part of the spectrum in which they are situated. The photograph, however, which shows the lines with most distinctness was taken between 1 and 2 p. m. and the spectrum extends to a distance below A equal to that of the line C above it, or very considerably beyond the limits of Mr. Hennessey's map and of the earlier ones by Brewster and Gladstone.

The following papers were read :—

1. *On the S'ūlvasūtras ; or Notes on the beginning of Geometry in India.*—By DR. G. THIBAUT, *Anglo-Sanskrit Professor, Banáras College.*  
(Abstract.)

This paper, a portion of which was read by Dr. Thibaut at the last Oriental Congress, has been printed with numerous diagrams in No. III of Pt. I, of this year's Journal. Dr. Thibaut has published several of the S'ūlvasūtras in the Banáras "Pandit."

Extracts from the paper were read by the Secretary.

2. *On a new species of Tupistra from Upper Tenasserim.*—By S. KURZ.  
(Abstract.)

In this paper the author describes a second species of *Tupistra* under the name of *F. Stoliczkana*. It is one of the numerous valuable



plants collected for the author by the late Dr. Stoliczka and is remarkable for its stiff, robust erect spikes, those of *S. nutans* being comparatively slender and so much decurved that the fruits when ripe are usually found buried in the mould of the dark forests in which the plant grows.

The paper will appear in the Journal, Part II.

3. *List of Reptilia and Amphibia collected by the late Dr. Stoliczka in Kashmir, Ladak, Eastern Turkistan and Wakhán, with descriptions of new species.*—By W. T. BLANFORD, F. R. S.

(Abstract.)

This paper contains a list of the Reptiles (lizards and snakes) and Amphibia, collected by the late Dr. Stoliczka, similar to the list of mammalia already published (J. A. S. B., 1875, p. 106). Owing in a great measure to the season of the year at which many of Dr. Stoliczka's journeys were made, and to the ground being covered with snow for months together in the regions traversed, and also in part to the poverty of the fauna, the number of species obtained is not large, and comprises 15 lizards, 9 snakes, and 4 Amphibia. Eight lizards (six of which appear to be undescribed) and two snakes were obtained in Eastern Turkestan around Yárkand and Káshghar. Of several of the species found large numbers were collected.

The following are the new species described :

*Stellio Stoliczkanus*, a slender form (inhabiting the open steppes) having the dorsal scales somewhat as in *S. Caucasicus*, but with fewer enlarged scales on the sides, no patch of thickened scales on the abdomen, and the tail scales scarcely exceeding in size those on the middle of the back. It probably resembles *S. Aralensis*, but the toes are not fringed as they are said to be in that species.

*Phrynocephalus axillaris*, near *P. maculatus*, but the limbs are rather shorter, the toes less fringed, and the colouration different. There is no black tip to the tail, nor red colour beneath the base of the tail, and there is always a red spot behind each axil.

*Gymnodactylus elongatus*, a peculiar elongate form, with the tail equal in length to the body and head, back with numerous large trihedral tubercles, tail not tuberculated, but with the posterior row of scales in each verticil enlarged and carinate; præanal pores about five in number.

*G. microtis*, a small sandy coloured form, with a smooth tail, small tubercles on the back, and a very minute ear opening, probably allied to the species described by Pallas under the name of *Lacerta pipiens*.

*Eremias Yarkandensis*, allied to *E. cæruleo-ocellata*, to which it was referred by Dr. Anderson, but it appears more nearly allied to *E. multiocellata*, and it may perhaps be identical, though the description does not coin-



cide. The present species has the nasal shield not tumid, the dorsal scales almost without intervening granules, the scales on the anterior portion of the tail smooth as a rule, no azygos shield between the post-frontals, and the ventral scales in 14—16 oblique and about 30 transverse series.

*E. vermiculata*, a very elongate form, with the tail more than twice the length of the head and body, ventral shields in 16—20 oblique, and 36—41 transverse series, and supra-orbital shields surrounded by granules. Colour,—grey vermiculated with black.

All the above species were found in the plains of Eastern Turkestan.

The paper will appear in the Journal Part II, No. 3, 1875.

#### 4. *Description of twenty-one new Indian Plants.*—By S. KURZ.

(Abstract.)

The author describes the following new species.

*Zanthoxylon Andamanicum*, from the Andamans; *Aglaia paniculata*, from Pegu and Tenasserim; *Amoora lactescens* and *Amoora dysoxyloides*, from Martaban; *Walsura oxycarpa*, from the Andamans; *Daphniphylopsis capitata*, from the Himalayas in Sikkim and Martaban; *Natsiatopsis thunbergiæfolia*, from Ava; *Ilex Sikkimensis* from the Sikkim Himalayas; *Gymnosporia Thomsoni*, from Sikkim and Bhután; *Gymnosporia Gibsoni*, from the Bombay Presidency; *Lophopetalum fuscescens*, from Singapore; *Salacia Jenkinsii*, from Assam; *Salacia platyphylla*, and *Hippocratea*, *Nicobarica*, from the Nicobars; *Vitis costata*, from Pegu; *Vitis Neurosa* from the Khásia Hills; *Vitis Vicaryana*, from Dehra Dún; *Sapindus tomentosus*, from Ava, and Khakyen Hills; *Sapindus microcarpus*, from Siam; *Pometia macrocarpa*, from Malacca; *Dalbergia stenocarpa*, from Sikkim and Pankabári.

The paper will be published in Part II of the Journal.

#### 5. *Description of new species of Oaks.*—By S. KURZ.

(Abstract.)

The author describes some new species of oak—*Quercus mespilifolia*, from the Arracan Hills; *Q. xylocarpus*, from the Arracan Hills and Asám; *Q. olla*, from Asám and *Q. pachyphylla*, from the forests of Tounglú and the Phallút mountains.

The paper will be published in Part II, of the Journal.

The following communications have been received—

1. *Rough Notes on the Angámi Nágás and their Languages.*—By Captain JOHN BUTLER, B. S. C., *Political Agent, Nágá Hills, Asám.*
2. *An account of the Maiwár Bhils.*—By T. H. HENDLEY, *Surgeon, Jaipur Agency, Rájputaná.*



## LIBRARY.

The following additions have been made to the Library since the meeting held in August last.

*Presentations.*

••• Names of Donors in capitals.

Proceedings of the Royal Society. Vol. XXIII, No. 162.

*D. Ferrier.*—The Croonian Lecture, Experiments on the Brain of Monkeys. *Col. J. T. Smith.*—On the Liqutation of Alloys of Silver and Copper. *J. Williams.*—Note on the Discharge of Ova, and its relation in point of Time to Menstruation. *Sir W. Thomson.*—Electrodynamic Qualities of Metals. Electrolytic Conduction in Solids. *W. C. Roberts.*—On the Liqutation, Fusibility and Density of certain Alloys of Silver and Copper.

ROYAL SOCIETY, LONDON.

Proceedings of the Royal Geographical Society. Vol. XIX., Nos. 5 and 6.

No. 5. *Markham.*—Travels in Great Tibet, and Trade between Tibet and Bengal.

ROYAL GEOGRAPHICAL SOCIETY, LONDON.

Journal of the Statistical Society. Vol. XXXVIII., Pt. 2., June, 1875.

STATISTICAL SOCIETY.

Proceedings of the Institution of Mechanical Engineers. April, 1875.

*Major Beaumont.*—On Rock Boring by the Diamond Drill, and recent applications of the process.

INSTITUTION OF MECHANICAL ENGINEERS, BIRMINGHAM.

Journal of the Anthropological Institute of Great Britain and Ireland. Vol. V. No. 1, July, 1875.

*Lieut. C. C. de Crespigny.*—The Milanows of Borneo.—*Major Godwin-Austen.* Further Notes on the Rude Stone Monuments of the Khasi Hill Tribes.

ANTHROPOLOGICAL INSTITUTE OF GREAT BRITAIN AND IRELAND.

Journal of the Chemical Society. Vol. XIII. May, June, and July, 1875.

*May. J. L. W. Thudichum.*—Further Researches on Bilirubin and its Compounds.

*June. J. Clerk-Maxwell.*—On the Dynamical Evidence of the Molecular Constitution of Matter.

CHEMICAL SOCIETY, LONDON.

Proceedings of the Zoological Society of London, Pt. IV. 1874, Pt. I. 1875.

Pt. IV. *R. Swinhoe.*—Letter respecting some Bats obtained in China. *F. Moore.*—Description of New Asiatic *Lepidoptera*.

Pt. I. *Dr. G. Bennett.*—Letter from, concerning the occurrence of an Indian Beetle (*Chrysochroa ocellata*) in the Bay of Bengal. *A. Anderson.*—Corrections of and additions to "Raptorial Birds of North-Western India. *Major Godwin-Austen.*—Supplementary Notes on the Species of *Helicidae* of the Subgenus *Plectopylis*.



Transactions of the Zoological Society of London. Vol. IX. Pts. 1, 2, 3, 1875.

Pt. 2. *Arthur Viscount Walden*.—A List of the Birds known to inhabit the Philippine Archipelago.

#### ZOOLOGICAL SOCIETY OF LONDON.

Journal of the Royal Geographical Society. Vol. 44, 1874.

*S. W. Bushell*.—Notes of a journey outside the Great Wall of China. *G. Phillips*.—Notes on Southern Mangi. *C. Millingen*.—Notes of a journey in Yemen. *R. G. Watson*.—Notes of a journey in the Island of Yezo in 1873; and on the Progress of Geography in Japan. *Major B. Lovett*.—Narrative of a visit to the Kuh-i-Khwâjah in Sistan. *Captain S. B. Miles*.—Journey from Gwâdur to Karâchi. *Major-General Sir F. Goldsmid*.—Notes on recent Persian Travel. *E. Delmar Morgan*.—Col. Stebnitzky's Report on his journey in 1872 in Central and Southern Turkomania.

#### ROYAL GEOGRAPHICAL SOCIETY, LONDON.

Minutes of Proceedings of the Institute of Civil Engineers. Vol. XL, 1874-75, Pt. II.

#### INSTITUTE OF CIVIL ENGINEERS.

Transactions of the Asiatic Society of Japan from October, 1872 to July, 1874.

#### ASIATIC SOCIETY OF JAPAN.

Transactions of the Archæological Society of Agra. January to June, 1875.

#### ARCHÆOLOGICAL SOCIETY OF AGRA.

Bôrô-Bodour dans l'île de Java, par le Dr. C. Leemans, with drawings and Photographs illustrating the work.

#### BATAVIAN SOCIETY OF ARTS AND SCIENCES.

Cobden Club Essays. Local Government and Taxation. Report of the Proceedings at the dinner of the Cobden Club, June, 1873 and July, 1874.

#### COBDEN CLUB.

Zeitschrift der Deutschen Morgenländischen Gesellschaft. Vol. 29, Pt. I.

*A. Bastian*.—Die Verkettungstheorien der Buddhisten. *Th. Nöldeke*.—Zur Geschichte der Araber im 1. Jahrh d. H. aus Syrischen Quellen. *Ed. Sachau*.—Algebraisches über das Schach bei Birûnî.

#### GERMAN ORIENTAL SOCIETY.

Sitzungsberichte der Philosophisch-philologischen und historischen Classe der K. B. Akademie der Wissenschaften. Pts. I. and II. 1874.

Mathematisch-physikalischen Classe. Pt. III. 1874.

Pt. II. *V. Schlagintweit-Sakünlünski*: Ueber das Genus Rosa in Hochasien und über Rosenwasser und Rosenöl.

*Serjania Sapindacearum* genus Monographice Descriptum, von *L. Radlkofer*.



Ueber den religiösen Charakter des griechischen Mythos, von Dr. Conrad Bursian.

ROYAL BAVARIAN ACADEMY OF SCIENCES, MUNICH.

Ueber die Wasserabnahme in den Quellen Flüssen und Strömen bei gleichzeitiger Steigerung der Hochwasser in den Culturländern, von Gustav Wex.

ROYAL ACADEMY OF SCIENCES, VIENNA.

Monatsbericht der Königlich Preussischen Akademie der Wissenschaften zu Berlin. April and May, 1875.

ROYAL PRUSSIAN ACADEMY OF SCIENCES, BERLIN.

Oesterreichische Monatsschrift für den Orient. Nos. 7, 8 and 9, July, August and September, 1875.

No. 9. Dr. J. Chavanne.—Die projectirten internationalen Schienenwege nach Indien und China.—Aerztliche Ansicht über die Colonisation Niederländisch-Indiens.

ORIENTAL MUSEUM OF VIENNA.

Mittheilungen der Deutschen Gesellschaft für Natur und Volkerkunde Ostasien's, Pt. 7. June, 1875.

GERMAN JAPAN SOCIETY OF EASTERN ASIA.

Bulletin de la Société de Géographie, June and August, 1875.

GEOGRAPHICAL SOCIETY OF PARIS.

Bulletin de la Société d'Anthropologie der Paris, Tome. X. Mars à Mai, 1875.

Morice.—Sur l'anthropologie de l'Indo-Chine.

ANTHROPOLOGICAL SOCIETY OF PARIS.

Memoires de la Société Royale des Antiquaires du Nord. Nouvelle Série, 1873-74.

Aarboger for Nordisk Oldkyndighed og Historie. Hefte I to IV, 1874.

Tillæg til Aarboger for Nordisk Oldkyndighed og Histoire. Aargang, 1873.

Islendinga Sögur. Tredie Bind,—1875.

Njála.

SOCIETY OF NORTHERN ANTIQUARIES, COPENHAGEN.

Mémoires de la Société Royale des Sciences de Liège, 2<sup>e</sup> Série. Tome IV and V. 1873-74.

Tome V. Candèz.—Insectes recueillis au Japon par M. G. Lewis, pendant les années 1869—1871.—Elatérides.

ROYAL SOCIETY OF SCIENCES, LIE'GE.

Bulletin de la Société Impériale des Naturalistes de Moscou. No. 4, 1874.

K. Motschoulsky.—Énumération des nouvelles espèces de Coléoptères rapportés de ses voyages.





Atti della Societa Toscana di Scienze Naturali residente in Pisa. Vol. I, fasc., 1 and 2, 1875.

TUSCAN SOCIETY OF NATURAL SCIENCES, PISA.

A Comparative Grammar of the Modern Aryan Languages of India, by John Beames, B. C. S.

AUTHOR.

• The Royal Tiger of Bengal, by J. Fayrer, M. D.

AUTHOR.

L' Art Khmer, par le Comte de Croizier.

AUTHOR.

Rig-Veda Sanhita, the first and second Adhyayas of the First Ashtaka, with Notes and Explanations, and an Introductory Essay on the Study of the Vedas, by the Rev. K. M. Banerjea.

AUTHOR.

Account of the Survey Operations in connection with the Mission to Yarkand and Kashgar in 1873-74, by Capt. H. Trotter, R. E.

AUTHOR.

Guldmynten fra Aak ag C. A. Holmboe.

AUTHOR.

Corrections of, and additions to "Raptorial Birds of North-Western India," and,—On the Nidification of certain Indian Birds, by A. Anderson.

AUTHOR.

Traité des Berakhoth du Talmud de Jérusalem et du Talmud de Babylone, par Moïse Schwab.

Venísambhâra; Die Ehrenrettung der Königin, von Julius Grill.

Ist in der indogermanischen Grundsprache ein nominales Suffix *ia* oder Statt dessen *ya* anzusetzen?

Ueber die Entstehung und die Formen des indogermanischen Optativ (Potential), von Theodor Benfey.

H. BLOCHMANN, M. A.

The Seventeenth Anniversary Report of the Burra Bazar Family Literary Club.

THE SECRETARY.

The Calcutta Journal of Medicine, Nos. 10 to 12, October to December, 1874, edited by Mahendra Lál Sircár, M. D.

EDITOR.

Instructions for the Electrical Testing of Lines and Offices, by Louis Schwendler.

AUTHOR.

The Countess of Chinchon and the Chinchona Genus, by Clements R. Markham.

W. T. BLANFORD, Esq.



Report of the Commissioner of Agriculture for 1873.

DEPT. OF AGRICULTURE, U. S. OF AMERICA.

An Essay concerning important Physical Features exhibited in the Valley of the Minnesota River, by Major G. K. Warren.

ENGINEER DEPT. U. S. ARMY.

On Leprosy and Elephantiasis, by H. Vandyke Carter, M. D.

A Grammar of the Arabic Language, by W. Wright, D. D., Vol. II.

Yajur Veda Sanhita, Pts. 8 to 12.

HOME DEPT. GOVT. OF INDIA.

Records of the Geological Survey of India, Vol. VIII. Pt. 3, 1875.

DEPT. OF REVENUE, AGRICULTURE, AND COMMERCE.

Synopsis of the Results of the Operations of the Great Trigonometrical Survey of India, by Col. J. T. Walker, R. E., vol. II., (2 copies).

SUPERINTENDENT OF THE SURVEY.

Annals of Indian Administration in the year 1873-74, edited by G. Easton.

Report of the Sanitary Commissioner for Bengal for 1874, by Surgeon-Major J. M. Coates.

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Report on the Sanitary Administration of the Punjab for 1874.

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Annual Report of the Sanitary Commissioner of the Central Provinces for 1874.

Report, with the Chief Commissioner's Review, on the Forest Administration of the Central Provinces for 1874-75.

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Report on the Administration of the Land Revenue Department of the Central Provinces for 1874-75.

Report on the Trade and Resources of the Central Provinces for 1874-75.

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Report on Public Instruction in the Madras Presidency for 1873-74.

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Nyâyakosa, or Dictionary of the Technical Terms of the Nyâya Philosophy, by Bhimâchârya Jhalakîkar.

Bombay Sanskrit Series, No. XIV, Vikramânkadevacharita.

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Statistical and Historical Account of the District of Thayetmyo, Pegu Division of British Burma, with Maps, by Lt.-Col. H. A. Browne, Deputy Commissioner of British Burma.

*Purchase.*

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*F. M. Balfour.*—A Comparison of the Early Stages in the Development of Vertebrates. *A. A. W. Hubrecht.*—Some Remarks about the Minute Anatomy of Mediterranean Nemerteans. *E. Ray Lankester.*—On some new Points in the Structure of *Amphioxus* and their Bearing on the Morphology of *Vertebrata*. *T. R. Lewis.*—On Nematode *Hematozoa* in the Dog.

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*W. S. W. Vaux.*—On an Unique Coin of Platon, a King of Bactriana.

The London, Edinburgh, and Dublin Philosophical Magazine, Vol. 50, Nos. 328, 329.

No. 328. *R. Mallet.*—On the Temperature attainable by Rock-crushing and its Consequences. *H. Bauerman.*—An Experiment for showing the Electric Conductivity of various forms of Carbon. *Capt. Abney.*—On Photographic Irradiation. *C. J. Woodward.*—On an Apparatus to illustrate the Formation of Volcanic Cones.

No. 329. *W. M. Watts.*—On a New Form of Micrometer for use in Spectroscopic Analysis. *C. Tomlinson.*—On some Phenomena connected with the Boiling of Liquids.

The Quarterly Journal of Science, No. 47, July, 1875.

The Mechanical action of Light.

Journal of the Society of Arts, Vol. XXIII, Nos. 1177 to 1184.

No. 1177. *Rev. J. Long.*—The Russian Advance in Central Asia, in its Commercial and Social Aspects towards India and the East. The Navigation of the Oxus.

No. 1181. Concentrated Beer.—The Production of India-rubber. Indian Agriculture.

The Annals and Magazine of Natural History, Vol. 16, Nos. 91, 92.

No. 91. *E. Metschnikoff.*—On the Development of *Calcispongiae*.

No. 92. *M. A. Giard.*—On the Position of *Sagitta*, and on the Convergence of Types by Pelagic Life. *A. G. Butler.*—List of the Species of the Homopterous Genus *Hemisphaeruis*, with Descriptions of new Forms in the Collection of the British Museum. *E. A. Smith.*—A List of the *Gasteropoda* collected in Japanese Seas by Commander H. C. St. John, R. N. *E. J. Miers.*—Description of three Additional Species of *Crustacea* from Kerguelen's Land and Crozet Island, with Remarks upon the Genus *Paxamæra*. *J. Wood-Mason.*—On the Occurrence of a Superorbital chain of Bones in the *Arboricole* (Wood-Partridges). *M. A. Villot.*—On the Helminthological Fauna of the Coasts of Brittany.

The Westminster Review. No. 95, July, 1875.

The Quarterly Review. No. 227, July, 1875.

The Edinburgh Review. No. 289, July, 1875.

The Messenger of Mathematics. Nos. 45 to 51, January to July, 1875.



No. 8. *C. Müller*.—Untersuchung über die Tönhöhen der Transversalschwingungen poröser Gypsstäbe wenn dieselben mit verschiedenen Flüssigkeiten getränkt sind. *A. Kundt und E. Warburg*.—Ueber Reibung und Wärmeleitung verdünnter Gase. *H. Morton*.—Fluoreszenzverhältnisse gewisser Kohlenwasserstoffverbindungen in den Steinkohlen—und Petroleumdestillaten. *F. Kohlrausch*.—Bemerkungen zu Hr, Neesen's Beobachtung über die elastische Nachwirkung. *A. Streintz*.—Erwiderung auf die "Bemerkungen" des Prof. O. E. Meyer zu meiner Abhandlung: Ueber die Dämpfung der Torsionsschwingungen von Drähten. *A. Oberbeck*.—Ueber eine Methode, die Leitungsfähigkeit von Flüssigkeiten für die Elektrizität zu bestimmen. *L. Sauer*.—Experimente über die Sichtbarkeit ultra-violetter Strahlen. *H. Schneebeli*.—Ueber die Anziehungs—und die Abstofsungszeit der Elektromagnete. *F. Schaack*.—Zur construction von Blitzableitern für Telegraphen—Leitungen. *P. La-Cour*.—Ueber die Anwendung der Stimmgabel in der elektrischen Telegraphie. *Hillebrand und Norton*.—Elektrolytische Abscheidung des Cers, Lanthans und Didyms, *W. Holtz*.—Ueber die Umwandlung elektrischer Ströme niederer Spannung in disruptive Entladungen höherer Spannung. Nachträgliche Notiz über eine neue elektrische Röhre, von Demselben.

Large Game Shooting in Thibet and the North-West, by A. A. A. Kinloch.

A year on the Punjab Frontier, in 1849, Vols. I and II., by Major, H. B. Edwards.

India Tracts, by J. Z. Holwell.

Encyclopædia Britannica, 9th Edition, Vols. I and II.

A brief History of the Bhopal Principality in Central India, by Major W. Hough.

A Comparative Grammar of the Dravidian or South-Indian Family of Languages, by the Rev. R. Caldwell.

Hints to Travellers, published by the Royal Geographical Society of London.

Anthropological Notes and Queries, published by the British Association.

#### Exchange.

Nature. Vol. 12, Nos. 297 to 307, July to September, 1875.

The Geographical Magazine. Vol. II., No. IX.

Capt. H. Trotter, R. E.—Notes on Recent Explorations in Central Asia. The Amu Darya Expedition.

The Athenæum. Pts. 569 to 571, May to July, 1875.

The Indian Antiquary. Vol. IV. Pts. 46 and 47, September and October, 1875.

Pt. 47. *H. Blochmann*.—Eight Arabic and Persian Inscriptions from Ahmadâbâd. *E. Rehatsek*.—Biography of Jellâl-al-Din Rûmi. *J. Beames*.—On the Age and Country of Bidyâ-Pati. *M. J. Walhouse*.—Archæological Notes. Notes on the Antiquities found in parts of Upper Godâvari and Krishna Districts.



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR DECEMBER, 1875.

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The monthly General Meeting of the Society was held on Wednesday, the 1st December, 1875, at 9 o'clock P. M.

T. Oldham, LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were announced—

1. From the Government of India, Home Dept., a set of 67 photographs of the ancient Architectural remains of Chutiá-Nágpur, taken by T. F. Peppé, Esq.

2. From the Director of the Imperial Botanical Garden of St. Petersburg, Trudbi, Imperatorskago Petersburgkago Botanischekago, Soda. Tome III, Pt. II.

3. From the Government of Bengal, a copy of the first volume of Dr. Hooker's Flora of British India.

4. From the Italian Society of Spectroscopists, through Prof. Tacchini, several numbers of their Journal.

The following gentleman, duly, proposed and seconded at the last meeting, was balloted for and elected an ordinary member :—

J. B. Knight, Esq.

The Rev. J. D. Bate, Allahabad, and Maulawí Abdul Hai, Calcutta, duly proposed and seconded at the last meeting, were balloted for and elected Associate Members.

The following are candidates for ballot at the next meeting :—

W. McGregor, Esq., Supdt. Indian Telegraphs, Akyab, proposed by Mr. H. Blochmann, seconded by Col. H. Hyde, R. E.

Ottokar Feistmantel, Esq., M. D., Geological Survey, Calcutta, proposed by Mr. H. Blochmann, seconded by Dr. T. Oldham.

The following gentlemen have intimated their desire to withdraw from the Society—

Thos. W. Bourne, Esq., A. D. B. Gomes, Esq., Rájá Chundranáth Rai, of Nator, C. B. Clarke, Esq.



Mr. Blochmann laid on the table his readings and translations of several Arabic and Persian Inscriptions from Dīhli.

A few months ago, Mr. J. G. Delmerick, Dīhli, presented to the Society a batch of very excellent rubbings taken by him at various places in and about Dīhli, and added the request that the readings and translations be published in the Society's Journal or Proceedings. Mr. Blochmann has read the greater part of them, and intends publishing them from time to time in the Proceedings. Mr. Delmerick has kindly promised to send another batch from Hāṣi and Hīṣār.

## I.

From the *Mazār*, or mausoleum, at Dāūd Sarāi, 11 miles from Shāh-jahānābād, near the Metcalf Estate and the Kuṭb Minār.

بناء ابن عمارت گنبد در عهد سلطان الاعظم ابوالمظفر سکندر سلطان خلد الله  
ملکه و سلطانه بانى گنبد شيخ علاؤ الدين نور تاج شيخ نبسه قطب العالم شيخ  
فريد شکر گنج ماه محرم سنه ثلث عشر و تسعمائة

The building of this dome (took place) in the reign of the great Sulṭān Abul Muzaḥḥar Sikandar, the king,—May God perpetuate his kingdom and rule! The builder of the dome is Shaikh 'Alā'uddīn (son of) Nūr Tāj Shaikh, a descendant of the pole of the world Shaikh Farīd Shakkarganj,\* in Muharram, 913 [May, 1517].

The builder is again mentioned in Inscription IV.

## II.

From the Rauzah of Muhammad Sharīf i Balkhī, outside Nizāmuddīn's well, west; 2 ft. by 4 in.

وفات امير المعظم المكرم المرحوم مغفور في روضة امير محمد شريف بلخي  
بقاريخ ست ماه ربيع الاخر سنه ثمان و ثلثين و تسعمائة

The death of the great generous Amīr, who is now pardoned and forgiven in the gardens of paradise, Muhammad Sharīf of Balkh, (took place) on the 6th Rabi' II., 938 [17th November, 1531].

## III.

From the *Mīhrāb* of the mosque outside the gate of Nizāmuddīn's well, north; 1 ft. by 1 ft. 1 in.

در عهد دولت محمد همايون پادشاه غازي ابن مسجد بنا کرد اميدوار رحمت  
کردگار قاسم يساوول بن مولانا علي ختلاني بقاريخ دوم شهر شعبان المعظم سنه ۹۴۰

This mosque was built during the reign of Muhammad Humá'yún Pádisháhi Ghází, by Kásim Yasáwul [court-usher], son of Mauláná 'Alí of Khatlán [in Badakhshán], who hopes in the mercy of the Almighty, on the 2nd Sha'bán, 940 [16th February, 1534].

\* The great saint of Dípálpúr (Panjáb).



## IV.

From the second Mazár at Dáúd Sarái; *vide* Inscr. I. Beautifully cut, 2 ft. 8 in. by 1½ ft.

بني هذا الخانقاه باسم قطب العالم شيخ فرید الدين گنج شکر في زمان سلطان  
الاعظم نصير الدين محمد همايون پادشاه غازي وكان بانيه علا نور تاج نبسة شيخ  
سنة احدى واربعين وتسعمائة ॥  
كتبه العبد حسين احمد

This prayer-room was built in the name of (in memory of) the pole of the world, Shaikh Faríd uddín Ganj i Shakkar, in the time of the great king Naçír uddín Muḥammad Humáyún Pádisháh i Ghází. And its builder is 'Alá (son of) Núr Táǵ, a descendant of the Shaikh, in 941 H. [A. D., 1534-35]. Written by the humble Husain Ahmad.

## V.

From the gate east of Kuṭb Sáhíb. Legible, but clumsy characters; 1 ft. 8 in. by 1 ft. 2 in. Metre, *Khafíf*.

در زمان شه جهان اسلام      شد بلند این در سپهر جناب  
گرچه صد باب هست جنت را      لیس باب بمثل هذا الباب  
کرد شیخ بنا که در بابش      یوسف ثانی از حق است خطاب  
چون ز تاریخ و نام کردم عرض      گفت درگاه خواجه اقطاب

1. In the reign of the king of the Muhammadan world, [Islám Sháh] this gate, which is the threshold of heaven, was erected.
2. Though paradise have a hundred gates, it has no gate like this gate.
3. A Shaikh built it to whom the title of 'a second Yúsuf' may justly be applied.
4. When I asked him for the chronogram and the name (of the structure), he said, (the date and the name are given in the words) '*Dargáh i Khwájah i Akáḍ*', 'the shrine of the saintly Khwájah.'

The letters added up give A. H. 958, or A. D. 1551.

## VI.

From a tomb in the courtyard (*çahn*) of Nizámuddín; 1 ft. 2 in. by 5 in. Metre, *khafíf*—

از جهان میرزا مقیم چورفت      نهصد و شصت و هفت شد تاریخ

It was in 967 H. [1559-60, A. D.] that Mírzá Muqím left the world.

## VII.

From a child's tomb inside the Rauzah of Mírzá Muqím (mentioned in the preceding), opposite Nizámuddín's shrine. 6 ft. 8 in. by 3½ in. *Rubá'i* metre.



افسوس که شد نهان بشهردهلی ماچه که محل طالعش کابل شد  
 آن تازه نهال گلشن حسن و جمال بگذاشت جهان وقایع بالکل شد  
 تاریخ وفات آن گل آمد از غیب برپاد زگلبن مراد آن گل شد  
 وفات ابو الفضایل بن مید مراد در سنه ۹۶۸

1. Alas! In the city of Dihlí a moon set which had risen in Kábul.
  2. This fresh plant of the flower-bed of beauty and comeliness left this world and vanished altogether.
  3. The chronogram of the death of this rose came from the unscen world, 'The wind scattered that rose of Murád's stem.'
- The death of Abul Fazáil, son of Sayyid Murád, (took place) in 968 [A. D. 1560-61].

## VIII.

From the courtyard of Amír Khusrau's Tomb. 1 ft. by 5 in.

وفات مرحومه سلیمه سلطان بنت امیر شهاب جامی تاریخ پنج شهر محرم  
 الحرام سنه نهصد و شصت و هشت \*

The death of the pardoned Salímah Sultán, daughter of the Amír Shiháb of Jám, (took place) on the 5th Muharram, 968 [26th September, 1569].

Amír Shiháb was governor of Dihlí in the beginning of Akbar's reign. His wife, Bába Aghá was related to Akbar's mother. For his biography, *vide* my *Aín Translation*, Vol. I., p. 332.

Letters were read—

1. From the Asst. Secretary to the Government of India, Foreign Dept., forwarding the following copy of a paper by Dr. da Cunha of the Bombay Branch of the Royal Asiatic Society, relating to some Portuguese Inscriptions which were discovered on the walls of the Fort of Mombassa, by Major C. B. Euan Smith, C. S. I., late Offg. Political Agent at Zanzibar.

(Copy.)

*Translation of the Inscription, No. I.*

In the reign of the King d' Phelipe II., Antonio de Sousa Godinho was by his order commanded to place this inscription on the new fortress of the island of Mombaca in the month of April of 1593, at the time when Mathias d'Albuquerque was Viceroy of India. Being Matheus Mendes de Vasconcellor Chief Captain of the Coast of the Sea (Melindi), this fortress was commanded to be built with the assistance of the Engineer from India, Master Joao Bautista Cairato, served by masons Manoel de Sousa and Ascanio Asis Rodrigues.

*Remarks.*—The above inscription has been engraven in a very confused style. Some words are not only shortened into one letter or two or



otherwise mutilated, and others disfigured by misspelling, but are most unsystematically transposed. Add to this the vacant spaces in the middle and beginning of the inscription where letters are entirely worn out, and the difficulties of their decipherment become apparent. Although these lacunæ have been filled up, the substitution of words is but a mere guess-work. Fortunately there are historical grounds for these conjectures.

A transcript of the inscription from its almost unintelligible inscriptionary writing of the sixteenth century into correct and modern Portuguese would run thus:—Reinando (o mui alto e poderoso *or* o serenissimo)\* Rei d' Phelipe II. mandon a Antonio de Sousa Godinho por sen mandado por (esta) ombreira† n'esta fortaleza nova da ilha de Mombaça ao mez d' Abril de 1593 (no tempo) em (que era) Vicò-rei da India Mathias d'Albuquerque (Esendo) Matheus Mendes (de Vasconcillor Capitao mor) da costa do mar de *Melindi* mandon fazer esta fortaleza (Ajudado pelo Engenheiro) da India (mestre Joao) Bautista Cairato servindo de (pedrevin Manoel) de Sousa e (Ascanio Aasis) Rodrigues. The parentheses above mark the vacant spaces which have been filled up.

The facts here recorded are, that in the reign of the King Phelipe II. of Spain and I. of Portugal, which lasted from 1580 to 1598,‡ when Mathias d'Albuquerque was Viceroy of India and whose Viceroyalty continued from 1591 to 1597§, Antonio de Sousa Godinho, who was the second Governor of Mombaza||, was commanded by the King to place the above inscription dated 1593 on the door-post of the fortress newly built in the island of Mombaza, while Matheus Mendes de Vasconcillor was the Chief Captain of the coast of Malindi and also the first Governor of Mombaza¶ with the assistance of an Engineer, famous in those times in India, by name Joao Baptista Cairato, who was charged with the building of the fortress.\*\*

Here all facts coincide and the date of 1593, so clearly given, is really the key to the decipherment of this rather problematical inscription. The only doubt that may be brought forward respecting the right interpreta-

\* It was usual among the Portuguese in the epoch this inscription refers to to place the words *o mui alto e poderoso* or *o serenissimo*, meaning 'the most high and powerful' or 'the most sereno' before the names of Kings, a fact attested to by the existing inscriptions of the coasts of Guzerat and Kaskan. One of these designations, besides, would exactly fill up the lacuna that precedes the name of the King d' Phelipe II.

† The word *ombreira*, which simply means 'door post' stands here for 'a door post with an inscription.'

‡ Dic. Hist. Capt. Novo Goa (1848) p. 108.

§ Borg. Hist. de Goa Idem (1858) p. 41.

|| Arch. Port. Orient. Idem (1861) Fasc. 3, pt. II, doc. 206, 111.

¶ Arch. Port. Orient. *ut supra* doc. 77, XXV., 140, XXVIII., 162, 111, 20611, 244, XIV.

\*\* Ibid doc. 76 to IX.



tion of the words, must be referable to the names of the Governor, who was commanded to fix the inscription and of the two masons who built the fortress. The former is solved by consulting the documents given in the foot note, the latter are scarcely of any historical importance.

*Translation of the Inscription, No. II.*

(In the year 16)48 John da Silva de Menezes entered this fortress and finding it much damnified, hastened to repair soldiers' lodgings, three magazines and one hospital, and commanded to rebuild the bastion 'Cavaleiro' and name it 'St. Antonio.'

*Remarks.* This inscription is far clearer than the No. I. It indicates plainly the advances the Portuguese artist had made during the fifty years elapsed between the two inscriptions. Its equivalent in modern Portuguese would run thus:—(Ens o anno de 16)48 reio entrar (Joao) da Silva de Menezes (nesta) forteleza, e achano a mui damnificada traton do reparo de cazas de Soldados e tres almazes (armazens) a una caza de hospital. E mandon refazer este baluarte 'Cavaleiro' por nome S. Antonio.

The year is evidently 1698, for it was then that the Viceroy of India Joao da Silva de Menezes paid a visit to the island of Mombaza.

Of the three blasons or arms in the N. W., S. W. and S. E. corners the first to the left, *i. e.* the N. W. corner, are the Royal Arms of Portugal. The next two are private ones, belonging most probably to the Governor or Captains of Mombaza, whose names are given as R. Alves Alberts and Paulo Matheus.

The arms of the Fidalgos of Portugal are not unfrequently seen engraven by the side of those of their Kings, the old Fort of Diu is an instance of this. The cross (generally a Maltese one) is often engraven by the side of the Royal Arms, and is known as the cross of the King d' Manuel the fortunate. It is either placed on one side of the arms, with an armillary sphere or globe on the opposite side, as still observed on the gateway of the citadel of Bassein, or above the arms with the sphere on one side and a little below it, and three arrows tied together on the other, as in the ruined Fort of Chaul.

The two inscriptions above, with the one given by Rev. G. P. Badger,\* and the landmark described in his report† by Dr. Kirk, who visited it on the 14th October, 1873, on the coast of Malindi, where it was first placed by Vasco da Gama on his first voyage round the Cape, and which has undergone the vicissitudes of being often removed and transplanted by

\* Introduction to the Travels of Ludovico di Varthema p. CIX. The inscription is dated 1635 and is said to have been discovered by Dr. Krapt in the fortress of Mombaza.

† This Report is published in the Bombay Gazette, 22nd January, 1874.



the native King\* make up the sum of all that has of late been known of the remains of the Portuguese monuments on the Coast of Zanzibar.

(Sd.) J. GERON DA CUNHA.

Bombay, 25th September, 1875.

*Translation.*

(a.)

The inscriptions in the three compartments.

Inscriptions over the inner door (1) are quite unintelligible. The name India occurs in the second, in the third there are\*

(a.)

* the equivalents of by his order.	(Por seu mandado) 1593 and the	the figures. names.
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Albuquerque Baptis Tacarato and Rodrigues.

(On the Commandant's House.)

(1) \*\*  
(a break)

(1)  
\* \* 48. Da Silva do Menezes entered the Fortress finding it \* \* \* dilapidated (he) undertook to have repairs made to the Soldiers' Houses (Barracks) and three Store houses and an Hospital and caused the inscription to be made. Knight by name St. Antonio.

(Crosses.)

"	"	"
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R. Alves Palow  
Alberts, Matheus.

Cross.

"

(True copy),

(Sd.) A. CARSON,  
Supdt.

(True translation),

(Sd.) ERNEST MENESSEE,  
Portuguese Translator to Govt.

*Extract from a letter from H. M.'s Political Agent and Consul General, Zanzibar, to the Secretary to the Government of India, Foreign Department, No. 76, dated Zanzibar, 31st July, 1875.*

Para. 6. \* \* \* \* \*

"I took this opportunity of requesting permission to have copied the few Portuguese inscriptions which are still to be found upon the walls of the fort. The one over the exterior gate having been described by Captain Burton was omitted. Through the kindness of Captain Grayan, the Hon'ble Feley Verekar of H. M. S. "Nassau," I am now enabled to enclose for your consideration copies of the other inscriptions extant which I believe have never been transcribed before. One of these numbered I, is let into the wall over the interior gate and is in pitch darkness. It would have escaped notice altogether, had it not been pointed out by the Arab Jemadar of the Fort who furnished a lantern and a ladder for its perusal."

\* Three Voyages of Vasco da Gama, the Hakluyt Society's publication, pp. 141 and 142.



2. From the Under-Secretary to the Government of India, Foreign Department, forwarding copies of a translation furnished by Lieut.-Col. S. B. Miles, Political Agent, Maskat, of extracts from an Arabic work relating to Aden as follow :

EXTRACTS FROM AN ARABIC WORK RELATING TO ADEN.

The following notes giving a glimpse at the state of Aden six centuries ago are taken from the Itinerary of Ibn El Mojawir called the *Tarikh-el-Mostabsir* and have been selected, not as being by any means the most interesting portion of the book, but as relating to a part of Arabia to which more than usual interest attaches as being a British possession. The author does not give a connected account of current events at Aden, but he offers some information respecting the internal condition of the place and the fiscal arrangements of the Government, which is not altogether without interest. Ibn El Mojawir was not a native of Aden, but kept a journal, and noted down what he saw and heard in the towns and countries he visited; he is quoted by El Khuzraji, the historian of Yemen, as an authority for the period at which he wrote. The text of the manuscript is very corrupt and full of *lacunæ*, which may account for some of the deficiencies of translation.

(Sd.) S. B. MILES, *Lieut.-Col.*

*H. B. M.'s Poltl. Agent and Consul, Muscat.*

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*On the state of Aden in former times.*

From the Red Sea to Aden and beyond Jebel Sokotera was one united expanse of land; there was no sea in it and no gulf. Then came Dhul-Karnein in his tour of conquest and arrived at that place, and Abú Jafar having opened the gulf towards the ocean, the sea flowed into it until it stopped at Bab-el-Mandeb, and Aden remained in the sea which surrounded it. After that nothing was visible from Aden except the summits of mountains like islands, and we have proofs of that. Firstly, it is known that the marks which the sea and the waves have left remain visible on the summits of Jebel el Kar and on the mountain on which is the fort of Ta'kar and on Jebel Akhdar. And the second proof is that Shedád bin 'Ad did not build Irem Dhát 'Imád except between Lahej and the gulf on one side, and Mawya, which is on the road to Mafalis, on the other, and that side which is toward Jebel Darrina is desert. He did not build it except in the most odoriferous lands and breezes and airs in a delicious country far from the sea. At the present time the sea has returned to the neighbourhood of Irem Dhát 'Imád and swallowed up part of it, and the sea would

\* In the absence of the Arabic text the spelling of the names of persons and places has been left, with a few exceptions, as given in Col. Miles' original translation. Ed.



not be there had it not been for the opening made by Dhul Karnein, by which it expanded itself from the island of Sokotera and flowed until it stopped at the extremity of El Mandeb. The third proof is that the sea, which is between Sarin and its limit, is called Mutarid El Kheil and Murabit El Kheil, and it was there that the Arabs originally used to tether their horses in that country. It is certain also they used to exercise their horses there when it was dry land. When Dhul Karnein opened Bab-el Mandeb all the country was flooded, and no signs of it were left except some islands that were formed in the sea, and it is called by its original name Mutarid El Kheil. From what is stated by the Amír Abú Tainí Jelash bin Nejab in his book *El Mufeid fi Akhbar Zebid El Awal* (for there are two Mufeids, the first whose author is the Amir Jelash, and the second, composed by Fakhr-ul-din Abu Ali Amara bin Muhammad bin Amara), it appears that the sea had greatly diminished when the Abyssinians conquered the Arabian Peninsula. They took possession of Sanaa at the border of the country of the 'Awahil, and their dynasty remained there both in pre-Islamite and Muhammadan times until Ali bin Mehdi destroyed them in the year 554 A. H., when their power disappeared and their rule declined with extreme rapidity. To return to the account of Dhul Karnein. The sea remained in that state until Dhul Karnein opened Bab-el Mandeb, and the sea flowed into it and reached the end of Kulzum, when it spread out and extended until it laid bare the land of Aden. The account that Abu Abdulla Muhammad ibn Abdulla Al Keysani gives in his commentary is, that when Shedad bin Ad set out from Yemen to visit the dependencies of Hadhramaut, and had passed the borders of Lahej, he saw Jebel Izz and conjectured from its size that it was very distant; he therefore sent his retainers to explore this mountain and see what was below it. When they had examined the place, they returned and said it was a valley in which were trees and huge serpents, and that it overlooked the salt sea. When he heard this account Shedad descended to Lahej and ordered his people to dig wells, and from these the people of Aden still continue to draw water. He also ordered they should excavate for him an entrance in the side of the valley.

*Excavation of the Entrance and Aqueduct.*

The excavation of the gate and aqueduct was performed by two men, and the wise men of Hind say they were Efrits of the Jinn. One of them commenced excavating the rock, while the other began to dig the trench at Ras Socotra, in the dependency of Lahej, and the two did not cease from their exertions in excavating and tunnelling until but little was left of the work. Then said the excavator—"If it be the will of God the Almighty, to-morrow I shall be free and have finished my work." And the digger of the trench said, "and I to-morrow will cause the water to enter



Aden whether it please God or no!" Then it came to pass that the aqueduct became broken in various places and the spring of water was checked at its source, and what had been built up fell down, and no part of it was completed, nor was any benefit derivable from it. The trench had been brought to the foot of Jebel Hadid, when it was brought to nought \* \* \*

\* \* \* But when the morning of the morrow came to the excavator the tunnel was finished, and the gate was opened, and the work was accomplished as he desired. It is said he was engaged in the excavation for a period of seventy years until it was completed. After a long space of time Shedad bin Ad used to throw into that place those who deserved imprisonment, and it remained a prison until the end of the dynasty that was at that time over Egypt, and after the decline of that dynasty the place became ruined.

*Cities used as Prisons.*

Siraf was the prison of Sultan Mahmoud bin Muhammad bin Sam, and Aden was a prison of the Pharaohs, but it ceased to be a prison under the Fatimites. The Indians say Aden was the prison of Das Sir, the name of a Jinn with ten heads, one of which was that of the deer Dilaeser, and he used to dwell on Jebel Mundhir, and to disport himself on the sands of Hokat Bay, and after that Hokat was inhabited by Indians, and no one was expelled therefrom except Suliman, son of Daud, on whom be peace, when he arrived at the land of Yemen to visit Bilkis, and this was by reason of the people before described being Efrits. Aden was so called, because he who founded it called it after his son Aden. Some say, however, that it derived the name of Aden from the tribe of Ad. It is also said that the first man who was imprisoned in it was named Aden, and it was called after him. And Ibn Mojawir says it derived the name of Aden from Ma'aden, because it was formerly an iron mine, and it was called by the Persians Akhirsikin, and by the Indians Siran. The merchants call it Tákal Saida, and it is also known as "Pharaoh's prison," "the abode of Jinns," and "the shore of the sea." By the Indians it is named Hatám, and by gentle folks it is considered a filthy place, because whatever people throw out there the wind drives back upon them; and it is styled by some the Custom House of Yenen. The house called by the common people *the House of Good Fortune* is the house built by Seif-ul-Islam Taghtagin opposite the Custom House, and they call *the Long House* the house built by Ibn Halem facing the Custom House. The house named Mundhir is the house built by Malik El Maiz Ismail bin Taghtagin upon Jebel Hokat, and it is called by merchants Sira and Hira. Jebel Sira is a lofty rock in the sea confronting Aden and Jebel Mundhir, of which it is said to be a portion. Muhammad bin Abdulla El Keysani says in his commentary that on the day of Judgment fire will be emitted from the Sira of Aden and



drive the people to hell, and the proof of that is, that in the heart of the rock is a well named Amber, and the sages of Hind call it Bir Yeran, and smoke issues from it perpetually. It is now called Bir Heramasat, and no one is able to look at it on account of its terribleness and its gloom and vapour. Round about the well are found broken stones and snakes sleeping and animals standing, and the Indians say that Hunwit, the before mentioned Efrit, dug this well, which indeed is not a well, but a subterranean passage excavated under the sea to the city of Ujain Bikrami, which is the capital of the King of Malwa in India. It was stated to me by Mubarak El Sharoni Maula, father of Muhammad bin Mesud, saying the cause of the excavation of the well Yeran was Hadather, and this Efrit stole the couch of the wife of Ram Haidar from the province of Oudh and flew with her until he rested on the summit of Jebel Sira. He then said to her:—I desire to change your form from that of a human being to that of a Jinn, and they began to wrangle, and Hunwit, who was an Efrit in the form of an ape, hearing them quarrel dug this passage from the city of Ujain Bikrami under the sea until it terminated in the centre of Jebel Sira, and he completed it all in one night. Issuing from the passage he found her (Haidar's wife) sleeping under a thorn tree on the top of the hill, so he took her on his back and descended with her into the passage, and ceased not to proceed with her until he arrived at Ujain Bikrami about daybreak, when he delivered her to her husband, Ram Haidar, who became blessed with two male children by her, one of whom was named Luth and the other Kus, and her's is a long story and requires a lengthy narration, but the passage exists to this day. To return to the former subject. When ships are retarded by the monsoon in their endeavours to reach the mouth of Aden harbour, they bring to Jebel Sira seven oxen about the time of sunset, and leave them in some place until the middle of the night. Towards the end of the night they send back six to Aden leaving but one ox there, which they sacrifice in the morning, and they call that sacrifice "the sacrifice of of the hill." When they have done this the ships are able to approach and arrive one after the other. This custom was instituted in ancient times during the sway of the Beni Zuri and other Arab dynasties, but the practice has ceased in our time.

*Note.*—When a ship on a voyage weathers Sokotera or Jebel Kudmul, they call that weathering "El Foulah," and they take a dish and put in it a sail and rudder and other appurtenances of a ship, and place therein some morsels of cocoanut, salt, and pomegranate and float it on the sea in the raging waves, and then say that it draws near and arrives in safety to the foot of the hill.

#### *The Building of Aden.*

With the fall of the Empire of the Pharaohs, Aden became ruined



and deserted, and the peninsula was inhabited only by fishermen who pursued their occupation there. These remained a long time provided by God's bounty, until the men of Kamar came in their ships in great numbers and took possession of the peninsula after they had expelled the fishermen by force, and they dwelt on the summits of Jebel Ahmar and Kokat and Jebel Munzhir which overlook the farms, and their signs and works are extant to this day in stone and mortar filling the valleys and hills. The poet says—

As for me I weep copiously ; for their houses have become empty.

And the leader of their camels has departed.

The anguish of separation makes me mad.

I stand on their habitations raving about them and asking :—

O houses ! have you news of them ?

Return me an answer quickly.

It was answered me from their houses wailing and crying :—

Weep blood, O neglectful one !

The caravans have departed.

My slave girl is with them : in elegance and qualities perfect ;

In face and form roselike and thornlike.

They used to start from El Kamar reaching Aden in one voyage and in one season. Ibn El Mojawir says that that race of people has died out, and their dynasty become extinct and their career terminated, and no one is to be found in our time who knows the history of them or can relate their condition and actions. Ibn El Mojawir says :—From Aden to Makdasho is one season (or journey), and from Makdasho to Kilwa another season's voyage, and from Kilwa to Kamar a third season ; but that tribe used to perform the three seasons' journey in one season, for one ship actually performed the voyage from Kamar to Aden in this way in the year 626 A. H. ; starting from El Kamar and bound for Kilwa it anchored at Aden. Their vessels had outriggers on account of the straitness of the seas and danger of the currents, and shallowness of the water there. When the tribe became enfeebled the Berbers overpowered them and expelled them thence, and possessed the land and inhabited the valley, the space now occupied by mat huts, and they were the first who erected mat huts in Aden. After them the place became ruined, and so remained until the men of Siraf invaded it, and mention has already been made of them before. And Sultan Shah bin Jemshid proceeded to Aden, and having disembarked established himself there, and the place became re-peopled thereby. It was his intention to have brought drinking water by aqueduct for the people from Zeila,\* but the distance proved too great, so he built tanks to collect the rain water, and the clay used for building them was brought from the

\* Zeila is a hamlet about forty miles north of Aden, where there is a perennial stream.



neighbourhood of Abien, or, as some say, from Zeila. When the population of Aden had much increased, several baths were erected, one bath being built near the Habs El Dam. In the year 622 A. H. a heavy torrent descended and swept clean the whole town. The Jama mosque was constructed near the bath of Motamid Razi-ul-Din Ali bin Muhammad El Tukriti, and this Prince built stables for his elephants in the year 625 A. H. And the population filled the space at the foot of Jabel Akhdar in its whole length and breadth, and when he perceived that he assumed the Sultanate.

*Titles and Names of the Kings of Ajam who ruled over the country of Aden.*

1. Sultan Shah bin Jemshid bin Asaad ibn Kaisar.
2. Abu Sinan Siawash bin Asaad bin Kaisar Kasim Amir El Mominin.
3. Abu El Muzuffar Asaad bin Kaisar Burkan Amir El Mominin.
4. Abu Shajaa Namshad bin Asaad bin Kaisar Nasra Amir El Mominin.
5. Abu El Fatah Keikobad bin Muhammad bin Kaisar Moiz Amir El Mominin.
6. Abu Said Kaisar bin Rustam bin Kaisar Umdat Amir El Mominin.
7. Abu Samsan Ad bin Shedad bin Jemshed bin Asaad ibn Kaisar Yemin Amir El Mominin.
8. Abu El Mulk Taj-ul-din Jemshed bin Asaad bin Kaisar Zabir Amir El Mominin.
9. Abu El Wafa Kudar Shah bin Hezeraat Yemin Amir El Mominin.
10. Abu El Burkat El Harith Hazaraad bin Jemshed bin Asaad Husain Amir El Mominin.

These were the Persian Kings who ruled in Aden.

*Building of the Walls of Aden.*

It was related to me by Abdulla bin Muhammad bin Yehia that a ship from the west once anchored at Aden at night, and the Captain having landed was walking around Aden, when he came to a lofty house in which were lighted candles and perfumes burning, so he knocked at the door and a slave descended and opened to him saying, 'Do you require aught'? The Captain replied, Yes; so the slave asked permission for him, and the master of the house said, 'Let him come', so he ascended, and they saluted each other, being unacquainted, and they began to converse, and the Captain said, 'I have arrived this night from the west, and I desire of the master's kindness that he will conceal for me some valuables'. He said, 'Why'? The Captain



replied, 'I am in fear of the Dai'. Then the master of the house said, 'I consent, have no fear of oppressors, transport all you have to a certain house'. So the Captain descended, and the merchants began to land their property from the ship in boxes and transport them to the house until they had lightened the ship of two-thirds of the cargo. When the morning came the Captain found his host of the night before to be the Dai himself, and he said to himself, "I sought shelter from the rain and sat down beneath the spout;" and he was troubled in mind, and his face became clouded. Then the Dai sent for him and said to him, 'I am your friend of last night, and I am the Dai, the Governor of Aden at this time; be comforted and set your mind at ease; the customs duties on your ship are a present from me to thee with the house in which you have alighted, and these 1,000 dinars are for your expenses while you remain in our city. God forbid I should take anything from you either in the way of present or of trade'. The Captain then said, 'Wherefore is all this done to me?' The Dai said, 'On account of your entering upon me in my house at midnight'. Then he gave orders that the wall should be extended from Hisn Akhdar to Jebel Hokat, but they constructed a very weak wall, and it fell down bodily and was destroyed by the unceasing action of the waves on it, and when it was ruined he built on it another wall of interlaced canes, and this remains to the present day. Abu Othman Omar bin Othman ibn Ali El Zangebili El Tukriti built a wall running along the height of Munzhir to the end of Jebel El Izz, and erected on it the Hokat gate; and he built a second wall on Jebel Akhdar, the extent of which was from Hisn Akhdar to El Takhar on the ridge of the hill. He also constructed a wall on the shore from El Tabagha to Jebel Hokat, in which were six gates, *viz.*, the Sabagha and Juma gates; the Sikka gate, which has two entrances or arches through which the torrent rushes when it rains at Aden; the Furza or customs gate for the merchandize to pass in and out; Bab Musharif or Musharij gate, which is continually open for the passage of people; and Bab Habak, that is always closed; there also the gate to the interior that has been mentioned before. The walls were built of stone and mortar, and he also constructed the Custom House, placing in it two gates. Ibn Zangibili besides constructed the old Kaisarea or covered bazars, and the markets or shops, and houses of stone, and Aden returned to its former state (of prosperity); but when Saif El Islam entered Aden, Ibn Zanjibili devoted all his property for religious purposes at Mekka in the year 575 A. H. El Malik El Maiz Taghtagin ibn Eiyub built a block of houses, the whole of which were shops at the gate, and he gave over the new Kaisarea to the druggists. Then Motamid Razi-ul-din Muhammad bin Ali El Tukriti erected buildings in the name of Malik El Mesaoud Eusuf bin Muhammad bin Ali Bekr, and the population increased in it; and they built houses and



amassed property, and many Arabs from all parts came and settled there. Afterwards Motamid Muhammad bin Ali built a beautiful bath, and the people dug wells and erected mosques with pulpits, and its splendour returned, and it is certain that it arose after the port of Abien had become ruined. And the merchants removed from the city of Abien and dwelt at Kalhat and Magdisho, and the three cities grew up at that time, but God knows.

#### *Description of Aden.*

The town is in a valley surrounded by the sea ; its climate is so bad that it turns wine into vinegar in the space of ten days. The water is derived from wells, and is also brought in by an aqueduct two fursakhs long. The sweet water wells in Aden are—Bir Hulkum and El. Sultaniya, Bir Ali bin Abi Burkat ibn El Katib, very old ; Bir Ahmed bin El Musib ; Bir ibn Abi Gharat, very old, it is near the gate of Aden ; Bir Mukaddum, also very old ; three wells belonging to Daud bin Muzmun, the Jew, and three wells belonging to Sheikh Omar bin Hossein, a well of Ali bin Hossein El Azruk ; Bir Jaafir, very ancient and forty cubits deep ; Bir Zafran known by its trough, and which is set apart for Moslems. I was informed by Abdulla bin Muhammad bin Yehia that the water of the Zafran well was carried to all the towns of Yemen, because, he said, Seif-ul-Dowla Ababak Soukar, a slave of Malik El Maiz Ismail bin Taghtageni, drank at the house of Mutamid Muhammad bin Ali El Tukriti some wine of very agreeable flavour, and he said to him—"Of what is this wine made?" Mutamid replied, "Of water from the Zafran well. If I steep Kadhy in this water and leave it in the sun, it becomes wine (Nebid), and it requires neither honey nor anything else being put in." From that time they were used to transport this water to Jend, Taiz, Sanaa, and Zebid to make wine with it. The water certainly is now earthy, though they say it was originally as (sweet) as the Euphrates, but that it has now become somewhat salt on account of the evil deeds of the people. I was informed by Muhammad bin Zankal bin Hassan El Kirmani that an inhabitant of Aden asserted he had been told by Abdulla bin Muhammad Ishaaki El Dai that there were 180 sweet water wells in Aden, and that the water never decreased, but God knows.

#### *Account of the arrival of Ships.*

When a ship arrives near Aden, and the watchmen on the hill perceive it, they shout with a loud voice "Hirya." These watchmen are stationed at the end of Jebel Akhdar, upon which is built the fort El Akhdar, originally called Sirsiat. The watchman is unable to distinguish clearly except at the rising and setting of the sun, because at those times the rays of the sun glance on the surface of the water and distant objects appear. He fixes



a stick upright before him, and when he fancies he sees anything, on the sea he marks it off on the stick, and if it is a bird or other such thing it moves to the right or left, or rises up or descends, and then he knows it is not a ship; but if the object remain steadfast in a line with the notch on the stick, he knows for certain that it is a ship, and he signals to his companion who shouts "Hirya," and signals to the next watchman, who hails the hulk "O slave in the ship." Then the hulk sends news of the arrival to the Governor of the town, and the messenger after leaving the presence of the Governor, informs the officers at the Custom House, and after doing this he shouts with a loud voice from the top of the hill "Hirya, Hirya, Hirya." And when the inhabitants hear the shouts, they ascend the hills and mount the roofs of their houses and gaze to the right and left. If the watchman's signal turn out correct, they give him for each ship one *dinar mulki* and the same amount from the customs; but if he gave a false notice, he gets ten stripes. When the ship draws near, the bearers of good tidings go in boats to meet the ships, and as they approach, they salute the *Nakhoda* and ask him whence he has come, and the *Nakhoda* asks them about the country and who the Governor is, and the state of the market; and every one in the ship who has relatives or friends in the country asks concerning them, and receives good news or condolences as the case may be. Then they place something before him and write the name of the *Nakhoda* and the names of the merchants. The clerk also notes down everything in the ship of the goods and cloths, and gives them the paper, and the bearers of good news get into their boat to return to their shore. All of them then go in a body to the Governor and give him the clerk's manifest, in which are written the names of the merchants, &c., and they give an account of the ship, whence it has come, and what merchandize it has brought. When they leave the Governor they go about the town acquainting those whose friends have arrived of their near meeting, and they receive the reward of good news from each. When the vessel arrives in harbour and anchors, the *Naiib* of the Sultan comes on board, and the examiner also, and he searches man after man, examining even their turbans, hair, sleeves, trousers, and under their armpits; and in the same way a matron searches the women. When the merchants land the next day, they bring their personal baggage, and after three days they land their cloth and merchandize at the Custom House, where they open every package and count piece by piece; and if the merchandize is saleable by weight, they weigh it in a steel-yard, and the Sheik assesses all the articles very heavily indeed until nothing is left; the merchants swearing by God Almighty that they have acted straightforwardly before the Sheiks. Ibn Mojawir says at such times despondency comes over the merchant, and grief kills him, and he remains in the valley of death at having been treated in such a way as to lose both blessedness and salvation.



*Account of Customs Duties.*

Truly the duties were introduced in the days of the Beni Zurria, and they say that the first who invented them was a certain Jew named Khalaj El Mahawendi, whose rules were conformed to until his death. On the *bahar* of pepper a duty of 8 dinars was taken, besides a *showabi* or convoy tax of 1 dinar, and 2 dinars on its leaving the Custom House; on a package of indigo, 4 dinars *showabi* tax, and on its leaving the Custom House a quarter dinar; on a *bahar* of assafoetida 8 dinars, and on a *bahar* of cherry bark  $3\frac{1}{2}$  dinars; on a *bahar* of *tabashir* they levied  $20\frac{1}{2}$  dinars, and 1 dinar *showabi*; on *Ud el-dafu* (aloes wood) half the value was taken; and on a *frasila* of camphor  $25\frac{1}{2}$  dinars; on a *bahar* of cardamoms 7 dinars; on a *frasila* of cloves 10 dinars and *showabi* 1 dinar, and from a *frasila* of 10 maunds they take 20 lbs.; on a *frasila* of saffron  $3\frac{1}{2}$  dinars; on a *bahar* of flax  $7\frac{1}{2}$  dinars, and when a ship is sold the vendor pays a fee of 10 per cent.; on iron they take half the value, a tax introduced in the days of the Dowla Saif El Islam Taghtagin bin Eiyub, who first took it from Abi El Hussun El Baghdadi, or, as some say, from a certain Kirawani in the year 598; on house owners a fourth part and some say a third and 2 dinars for notification; on a *bahar* of madder 12 dinars, introduced in the days of the Dowla Malik El Maiz Ismail bin Taghtagin, before whose time the duty was 2 dinars, or as some say 3; and on a *bahar* of tamarinds 3 *joz*; and on ten *Mokalib* or chemises  $2\frac{1}{2}$  dinars; on 10 goats three-quarter of a *jaiz*; on each sheep a quarter; and on each horse when it enters the town 50 dinars, introduced in the reign of Malik Nasir Eiyub bin Taghtagin bin Eiyub; on each horse when exported by sea they take 70 dinars; and on each slave 2 dinars, and when one is taken out through the gate half a dinar; on slave children from Sindapur 8 dinars and 1 dinar *showabi*; and they take on these children when passed out half a dinar each, which goes to the liquor contractor; on a piece of silk of Zebid manufacture half a dinar and 1 *jaiz*; on white cloth one-eighth; on dark coloured clothes 3 carats; on plaid waistcloths a quarter and 1 *jaiz*, and per score of coverlets (or cloaks) four dinars; per score of handwoven fabrics  $2\frac{1}{2}$  dinars, and the same on scarves; per score of unbleached Indian cloths  $2\frac{1}{2}$  dinars; on large striped linens 2 *joz* and 2 carats, and on small ditto 2 *jaiz* and 2 *fulús*; on every bag of millet one-eighth, and God knows and orders.

*Account of the introduction of the Showabi Tax.*

The Kings of the Beni Zurria were unacquainted with vessels of war, and remained so until the arrival in Yemen of Shums-ul-dowla Turan Shah bin Eiyub, who brought with him some war vessels. After him Othman bin Ali El Zanzibili El Tukriti became ruler of Aden, and the war vessels remained with him until he fled and Seif El Islam Taghtagin bin Eiyub



entered Yemen, and one of the most sagacious of the inhabitants counselled him saying—How do you consider it lawful to take customs from merchants? He replied, I do as the Kings of the Beni Eiyub did in following an old custom. The man said they used to take it from the people by force, but do thou take it in such a way that you may obtain the thanks of the people. Seif El Islām replied, And how can I do that? His adviser said, Send these war vessels to sea that they may protect the merchants from pirates, and so have honourable employment instead of lying uselessly rolling in the sun. He said, By God, you have come with good advice, and he despatched the vessels to India, where they were stationed off Ras Manadih to protect the merchantmen from the attacks of corsairs, and they remained thus until the year 613 A. H. After that there came to him some of the chief men, and said, God perpetuate the reign of Our Lord the Sultan, in that His Highness' treasury expends every year, on the war vessels 50,000 or 60,000 dinars without any return; but if His Highness were to take this amount from the merchants, it would be no loss to them. He said, How is that? They replied, On every 1,000 dinars of customs let there be taken also 100 dinars for the war vessels which will be for His Highness, and it will not burthen the merchants much. And this plan was adopted in the days of the Dowla El Mesud Eusof bin Muhammad ibn Ali Bekr bin Eiyub, and it remained so until the year 625 A. H. \* \*

*Articles that are not taxed.*

Articles imported from Egypt, such as wheat, flour, sugar, rice, soap, *el raki*, hyssop, perfumery, olive oil, oil of *el jar*, pickled olives, and everything connected with its transport, nuts for sweetmeats, if in small quantities, and honey in small quantities, and whatever is brought from India for re-exportation by sea, and pickled *emblie*, myrobalans, cushions, pillows, bracelets, leather tablecloths, rice, *kichri*, which is rice and pulse mixed, *simsim*, soap, red ochre, poisons, *karanful* wood, *garabi* cloth which is manufactured in Malabar, the productions of Shehr, *maklaj*, which are split dates with the stones extracted, and salt fish: these, however, are chargeable with duty if they have the heads on, but not otherwise, and Indian sandals, on which, however, duty is charged if furnished with straps, but not otherwise, sheep and goats also are not taxed, and beautiful slave girls brought from Dabul and large-eyed slave boys brought from India are not charged.

*Innovations at Aden.*

When it was the month of Jemadi el Awal in the year 624, or more correctly 625, a Dar El Wakalat was established in Aden, and on all merchandize on which no customs were taken they imposed a tax. At the



present time they levy five taxes altogether, *viz.*, the old tax which is the customs, the *showabi* tax, the Dar El Wakalat tax of one carat in the dinar, the Dar El Zakat, and brokerage. The Nakhoda Othman bin Omar El Amdi arrived once from Egypt and was found to have with him two maunds of aloes wood which they took from him, and when the time came to settle accounts the maund of aloes was valued at 6 dinars, so  $1\frac{1}{2}$  dinars were charged for the customs and half a dinar for the *showabi* tax. It was then valued in the Wakalat at 25 dinars, and it was charged 8 dinars and 2 *daniks* for Wakalat,  $1\frac{1}{2}$  dinars for Zakat, and half a dinar for brokerage, which altogether came to 15 dinars, so after deducting the price of the aloes six dinars there remained a balance against him of 9 dinars. The Nakhoda Othman bin Omar El Amdi protested, and said, "By God Almighty, I gain nothing by it, not a single *fuls*; is it not enough that you take from me the two maunds of wood for nothing, but you must demand of me 9 dinars besides!" And the Amir Nasir-ul-din Nasir bin Farât and his followers came upon them at that time, and he said—"This man is constantly coming to Aden and should we take from him double!" and he mediated between them until he squared the account. \* \* It is said that a ship once arrived on which the customs duties came to 80,000 dinars. There used to anchor every year under Jebel Sira 70 or 80 ships or more perhaps, but not less. And they despatched from Aden every year four treasure parties to the fort of Taiz, *viz.*, the receipts on the ship arrivals from India, the receipts from tribes entering Aden, the export duty on horses to India and the receipts from ships journeying to India. Each of these treasure remittances amounted to 150,000 dinars, or more, but not less, but this has ceased in our time, 625 A. H. The circulation of Aden in the time of the Beni Zurria was gold of Sanaa on the Sultani standard, but less than it and the currency of the country was gold *Maliki*, whereof  $4\frac{1}{2}$  dinars, equalled one Egyptian dinar. The *dinar* was divided into quarters, each quarter being equal to three *joz*, each *jaiz* to eight *fulûs*, and each *fuls* to two *beidhas*, and it is said the first who struck the *Maliki* dinar was Ahmed bin Ali El Sulehi at Sanaa.

They sell *rusi* (a kind of cloth) by the *Kasba*, the length of which is four cubits of iron, and they sell teak planks by the iron cubit, and everything was sold by auction to the highest bidder, and similarly slaves and slave girls.

Some disappointment was felt at Mr. Wood-Mason's announcement that the living specimen of *Rhinoceros Sondaicus*,\* which was to have been exhibited at the meeting, was indisposed, and could not attend; Mr. Mason,

\* The animal died on the following day. Its skin will be exhibited at the next meeting.—(J. W.-M.)



however, exhibited some excellent photographs of the animal in question, and of *B. Indicus*, and pointed out the differences in the structure of the epidermal exoskeleton in the two species.

Mr. Wood-Mason exhibited the materials for his monograph of *Paratelphusa*, an Indo-Malayan genus of freshwater crabs, of which he recognized altogether seven perfectly distinct and well-marked species; of these five had been or are now described by himself. The genus, he said, was established in 1855 by M. Milne-Edwards for the reception of two new species of crabs, one of which was supposed to have come from the China Seas, the other from New Zealand; but the localities given had proved to be incorrect, the former being really a native of the freshwaters of Southern China and Siam, the latter of those of the three great Sunda Islands—Java, Sumatra, and Borneo. Mr. Wood-Mason, in 1871, himself described two additional species, the one from upper Burmah, the other from India, wherein it ranged from Hardwár, the point at which the Ganges issues from the Siwálik Hills, throughout the Gangetic valley down to Calcutta, where brackish water conditions obtained, and where it occurred both in fresh and brackish water like several of its congeners. It was an interesting fact that all the species described by him inhabited countries the fauna of which was largely leavened, to say the least, with Malay forms, if indeed such forms did not predominate. We were indebted to Mr. W. T. Blanford, than whom nobody had ever done more for the distribution of animals in India, for dividing up the vast tract of country commonly called India into a number of zoological sub-provinces, to one of which, *viz.*, to that denominated by him the Eastern Bengal Province, with the Burmese countries and Assam added, the *Paratelphusas* were confined: Calcutta, Mr. Blanford had said, was on the edge of this province and rather in than outside of it; and Calcutta accordingly had its species of the genus in its common tank-crab. If we turned from these invertebrates to seek an instance amongst the higher animals of this Malayan leaven in the fauna, no more conspicuous one could possibly be found than the interesting animal represented in one of the beautiful photographs exhibited,—the *Rhinoceros Sondaicus*, which inhabited not only the Sunderbans near Calcutta but the great island of Java also. In conclusion, Mr. Wood-Mason said that he could not but look forward with much interest to see whether species of *Paratelphusa* would be found in Ceylon and in Malabar, the fauna of which curiously enough was also Malayan.

The following are the new species:

*Paratelphusa Martensi.*

Latero-anterior margins of carapace armed with three epibranchial teeth, the first tooth flattened, similar to the extraorbital angle but smaller, the rest salient, acute, and conical. Post-abdomen of the male triangular—as in *P. Dayana*, W-M.

*Hab.*—Throughout the Gangetic valley, from Hardwár to Jessor.



*Paratelphusa Edwardsi.*

Latero-anterior margins of carapace with four teeth, the teeth all equal and similar to one another, large, almost conical, and very salient. Carapace considerably areolated, longitudinally very convex, antero-lateral margins much inclined, post-frontal crest well-developed. Post-abdomen of the male as in the preceding.

*Hab.*—Cachar, Saddy, and the Gáro-, Nágá-, and Daffa-hills.

*Paratelphusa crenulifera.*

Latero-anterior margins of carapace with four teeth, the teeth tolerably well-developed and salient, flattened, diminishing gradually in size from before backwards. Carapace perfectly smooth, depressed, longitudinally but slightly convex, antero-lateral margins hardly inclined. Frontal and orbital margins conspicuously, the edges of the feebly-developed post-frontal crest and of the epibranchial teeth faintly crenulate. Post-abdomen of the male as in the preceding.

*Hab.*—Pegu Yomah.

Mr. Wood-Mason next exhibited a specimen of the beautiful macrurous crustacean long ago described and accurately figured by Herbst ('Krabben und Krebse', Band II, Heft 5, 1794, S. 173, T. XLIII, F. 2.) under the name of *Astacus modestus*. This remarkable crustacean, like the *Astacus zaleucus*, v. W-S. for which the new generic title *Thaumastocheles* had recently been proposed (P. A. S. B., 1874, p. 181), was an example of a transitional form connecting the two families, *Thalassinidæ* and *Astacidæ*: in *Thaumastocheles zaleucus* the facies of the former family was combined with characters that entered into the usual definition of the latter: *Eutrichocheles*, as he proposed generically to designate the species described by Herbst, on the other hand, was indubitably, as the totality of its organism showed, a member of the latter presenting certain structural arrangements which were unmistakable marks of real affinity to the former. The *Callinaxia adriatica* of Heller was just such another transitional form. In fact, it was now, in his opinion, impossible to frame such a definition of either family as would exclude all the members of the other owing to the number of the connecting links. The *Eutrichocheles modestus* was also especially interesting as being the nearest known blood-relation of the remarkable blind crayfish described two or three years ago under the name of *Nephropsis Stewarti*. In conclusion, Mr. Mason said that he had long been engaged in the comparative study of these and various other allied forms, and that he hoped shortly to be able to formulate the results at which he had arrived.

Mr. Wood-Mason also exhibited several new species of Stomatopod crustaceans, viz. *Clorida decorata*, with eyes as in *C. microphthalma* M.-Edw. and *C. Latreillei*, Ey. and Soul., the inner margin of the sabre-like



appendage, of the lateral portions of the caudal swimmeret armed with fine, acuminate spines, and the telson vermiculated above and below with granulated ridges, claw of raptorial arm 5-toothed—from the Andamans : *Coronis spinosa*, with three spines projecting from the telson just above the level of the marginal ones, of which there are three pairs, the median pair movable and smaller than the rest and with the interval between them finely serrated (5 or 6 teeth on each side of the middle line), between these and each lateral pair two spinules, between the teeth of each lateral pair one spinule ; claw of raptorial arm 10-toothed—from the Andamans and New Zealand : *Gonodactylus glyptocercus*, allied to *G. trispinosus*, with the telson ornamented with two oval tubercles bounded by an impressed invected line and with a median basal cinquefoil-shaped one, and the two preceding somites symmetrically engraved with fine lines—from the Nicobars ; and *Squilla supplex*, with three short oblique ridges on each side of the telson, between which and the strong median ridge, on each side, a row of confluent tubercles in the same straight line with the two median marginal teeth ; five teeth to the claw of the raptorial arms ; post-abdominal somites with 9 ridges, arranged 3 in the middle and 3 on each side—from Bombay.

The following papers were read :

1. *On some Lizards from Sind, with descriptions of new Species of Ptyodactylus, Stenodactylus, and Trapelus.*—By W. T. BLANFORD, F. R. S.

(Abstract.)

This paper contains notes on a collection of lizards made in Sind in the early months of 1875. Five species are added to the fauna of British India, two of which, *Stellio nuptus* and *Hemidactylus Persicus*, were previously known from Persia, whilst three appear to be new. These are described as :

*Ptyodactylus homolepis*, sp. nov.

Allied to *P. Hasselquisti*, but distinguished by having all the dorsal scales uniformly granular, without any enlarged tubercles, and the nostrils entirely surrounded by swollen shields 3 or 4 in number which separate them entirely from the rostral and labials. A perfect specimen measures  $7\frac{1}{2}$  inches, of which the tail is  $3\frac{1}{4}$ . Found in the lower hills of the Khirthar range, west of Upper Sind.

*Stenodactylus orientalis*, sp. nov.

General form stout, tail much thicker than in *S. guttatus*, finely granular throughout ; nostril between the corner of the rostral and three small shields, upper labials on each side about 10, lower 10—13, both becoming small behind : pupil vertical. No enlarged chin-shields behind the lower labials. Upper surface finely granular, with small convex dark coloured tubercles scattered over the back ; none on the limbs. Scales of abdomen scarcely



larger than those of the back. Toes short, thick, finely fringed on both sides, lower surface with cross plates, each divided into raised ribs or tubercles: all the toes with claws. Colour pale sandy, dotted over with the dark brown enlarged tubercles, dark transverse bands on the tail. The largest specimen obtained measures 3·3 inches, of which the tail from the anus is 1·4. One specimen obtained in the hills west of Mehar, another on sand-hills south of Rohri.

*Trapelus rubrigularis*, sp. nov.

General form similar to that of *T. ruderatus*. Head short, depressed. Both eyelids fringed with elongate pointed scales. Ear-opening larger than a nasal shield, without any fringe of long pointed scales partly covering the orifice, tympanum very little sunken. Scales of the back smooth or very faintly keeled, subimbricate, arranged in oblique rows, with larger bluntly keeled scales, each about equal to four ordinary scales, scattered irregularly over the back and basal portion of the tail, but not on the limbs. Tail-scales keeled. Scales of abdomen smooth. Claws moderate, those on the fore feet scarcely exceeding those of the hind feet in length and none of them half the length of the thumb without its claw. A single row of 10 to 12 pores just in front of the anus in males. Colour olive brown to grey, spotted with pale yellow, each enlarged scale of the back being in the middle of a pale spot. A dusky longitudinal line on each side of the neck and 3 or 4 pairs of dark spots on the back. A bright red patch beneath the throat in living specimens of both sexes; this colour disappears after a time in spirit. The largest specimen obtained was nearly 7 inches long, tail 3·8. Found in the semi-desert plain extending along the foot of the Khirthar range in Upper Sind.

The paper will be published with illustration in Part II of the Journal for 1876.

2. *Note on a large Hare inhabiting high elevations in Western Tibet.*

By W. T. BLANFORD, F. R. S.

(Abstract.)

The hare previously identified, with doubt, as *L. pallipes* proves, on comparison with specimens of the latter received from Mr. Mandelli at Darjeeling, to be distinct and is described as new under the name of *Lepus hypsibius*, from its inhabiting very elevated regions. The description is taken from a specimen collected by Dr. Stoliczka at an elevation of 15,500 feet in the Changchenmo valley, Ladak.

*S. hypsibius*, sp. nov.

Ears but little longer than the head, with only the extreme tips black, brown outside in front, whitish behind, buff inside, anterior dark band



ill-marked. General colour rufous brown, rump dusky ash, tail and lower parts white. Fur long, dense, and slightly curly, woolly near the base. Length of a skin from nose to rump 24 inches, tarsus, which is clad with very thick hair, 5. Ears from the head 4.5, skull 3.6.

The description will be published in full in No. 4, Part II. of the Journal for 1875.

8. *Note on the presence of a loreal pit in Elachistodon Westermanni, on Platycephalus semifasciatus, Ablepharus pusillus, and Blepharosteres agilis.*—By W. T. BLANFORD, F. R. S.

(Abstract.)

A snake from Purneah with a loreal pit has been recognised as *Elachistodon*, a remarkable genus with gular teeth. *Platycephalus semifasciatus* is identified with *Zamenis ventrimaculatus* and *Ablepharus pusillus* is recognised as distinct from *A. agilis* (*Blepharosteres agilis*, Stoll).

This note will be published in Journal Part II, No. 4, 1875.

#### LIBRARY.

The following additions have been made to the Library since the meeting held in November last.

#### *Presentations.*

\*\*\* Names of Donors in Capitals.

The Flora of British India. By J. D. Hooker, C. B., Vol. I.

Indian Wisdom, or Examples of the Religious, Philosophical, and Ethical Doctrines of the Hindus. By Monier Williams, M. A.

GOVERNMENT OF BENGAL, HOME DEPT.

Records of the Geological Survey of India, Vol. VIII, Pt. 4, 1875.

DEPT. OF REVENUE, AGRICULTURE AND COMMERCE.

Abstract of Results of a study of the Genera *Geomys* and *Thomomys*, by Dr. E. Cones, U. S. Army.

DEPT. OF THE INTERIOR, WASHINGTON.

Monatsbericht der Königlich Preussischen Akademie der Wissenschaften zu Berlin, Juni, 1875.

ROYAL PRUSSIAN ACADEMY OF SCIENCES, BERLIN.

Oesterreichische Monatsschrift für den Orient. No. 10, October, 1875.

ORIENTAL MUSEUM OF VIENNA.

Bulletin de la Société de Géographie, Septembre, Octobre, 1875.

Octobre.—L'Abbé Deagodins. Itinéraire de Yerkalo à Tse-Kow, (with map).

GEOGRAPHICAL SOCIETY OF PARIS.

Annales de la Société Géologique de Belgique, Tome Premier, 1874.

GEOLOGICAL SOCIETY OF BELGIUM.



Bollettino della Società Adriatica di Scienze Naturali in Trieste, Nro 5, 1875.

*Prof. A. Vierthaler.*—La Collezione di oggetti d'esportazione in Rangoon.

ADRIATIC SOCIETY OF NATURAL SCIENCES, TRIESTE.

Memoire della Società degli Spettroscopisti Italiani. Nos. 1 to 9, Gennaro à Settembre, 1875.

*No. 5. P. Tacchini.* Account of the observations made at Camorta on the occasion of the Total Eclipse of April 6, 1875.

ITALIAN SPECTROSCOPIC SOCIETY, PALERMO.

Trudbi Imperatorskago Petersburgkago Botanischekago Soda, Tome III, P. II.

THE DIRECTOR OF THE IMPERIAL BOTANICAL GARDEN OF  
ST. PETERSBURG.

Professional Papers on Indian Engineering, edited by Major A. M. Lang, R. E., No. 18, Vol. IV, October, 1875.

*Major C. A. Goodfellow.*—Notes on the Position of the Neutral Axis in a Beam subjected to Transverse Strain. *H. Leonard.*—Weight on Foundations of Buildings in Bengal. *H. Garbett.*—Protective River Works at Dera Ismail Khán. *Surgeon E. Nicholson.*—Experiments on Cements at Bangalore. Form of Channel of Constant Mean Velocity.

EDITOR.

The Christian Spectator, Vol. V. Nos. 53 and 54.

EDITOR.

Descriptions of five new species of *Helicida* of the subgenus *Plectopylis*, with remarks on all the other known forms,—and

Supplementary Notes on the Species of *Helicida* of the subgenus *Plectopylis*. By Major H. H. Godwin-Austen.

AUTHOR.

Conspectus of the Sub-orders, Families, and Genera of *Chiroptera*, arranged according to their Natural Affinities. By G. E. Dobson, M. A.

AUTHOR.

#### *Purchase.*

The Academy, Nos. 177 to 182, September, October, 1875.

Poggendorf's Annalen der Physik und Chemie, Nos. 9 and 10, 1875.

*No. 9. W. Weber.*—Ueber die Bewegung der Elektrizität in Körpern von molecularer Constitution. *A. Cornu.*—Ueber die Diffraction, namentlich über Brennpunkte—Eigenschaften der Gitter.

*No. 10. L. Bleekrode.*—Experimentelle Untersuchung über Elektromaschinen mit Ebonitscheiben. *H. W. Vogel.*—Photographische Spectralbeobachtungen im rothen und indischen Meere. *W. Siemens.*—Ueber den Einfluss der Beleuchtung auf die Leitungsfähigkeit des Krystallinischen Selens.

A Tract on Sacrifice (Yajnasudhanidhi) by Rev. F. Kittel.



A short Survey on the Vedic Polytheism and Pantheism, by the Rev. F. Kittel.

Manual of Coorg, a Gazetteer of the Natural Features of the country and the Social and Political Condition of its Inhabitants, compiled by the Rev. G. Richter.

The Law of Partition and Succession, from the MS. Sanskrit Text of Varadarajas Vyavaharanirnaya, by Dr. A. C. Burnell.

The Revenue Compendium of the Madras Presidency, by T. Gopal Kristnah Pillay, 2 Vols.

Nagavarma's Canarese Prosody, by the Rev. F. Kittel.

A Malayalam and English Dictionary, by the Rev. H. Gundert.

A Grammar of the Tulu Language, by the Rev. J. Brigel.

Dayadacacloki. Ten Stanzas in Sanskrit containing a Summary of the Hindu Law of Inheritance and Partition, with an English Translation, by Dr. A. C. Burnell.

A Grammar of the Malayalam Language, by the Rev. H. Gundert.

#### *Exchange.*

The Geographical Magazine, Vol. II, No. X.

Major H. Wood.—The Attrek Bed of the Oxus. A Sketch of Mongolia and the country of the Tangutans. Extracts from letters from Mr. Ney Elias.

Nature, Vol. 12, Nos. 38 to 312.

The Indian Antiquary, Vol. IV, p. 48, November 1875.

Major J. W. Watson.—Sketch of the Káthis, especially those of the Tribe of Khá-char and House of Chotilá. Prof. C. H. Tawney.—Metrical Translation of Bhartrihari's Niti Satakam. J. F. Fleet.—Sanskrit and old Canarese Inscriptions. W. F. Sinclair.—Rough Notes on Khándesh. V. Ball.—Nicobarese Hieroglyphics or Picture-Writing. Capt. J. S. F. Mackenzie.—Caste Insignia.



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## E R R A T A.



- Page xxi, for Purchase of Persian Printed Books *read* editing of Persian works in Bibl. Indica, &c.
- Page 6, line 25, for and who who want *read* and who want.
- Page 33, line 13, for Nos. X and XI *read* Nos. XI and XII.
- Page 36, line 3 from bottom, for Kurtz *read* Kurz.
- Page 37, line 35, for Blindwormas *read* Blindworms.
- Page 39, line 18, for Ross's *read* Rosse's.
- Page 43, line 14, for Islam Shah *read* Islâm Shâh.
- Page 44, line 4 from bottom, for Buddist *read* Buddhist.
- Page 45, line 26, for the 3rd of *read* of the 3rd.
- Page 46, line 32, for Ghalot *read* Ghatot.
- Page 58, line 14, for Dr. F. Hendley *read* Dr. T. H. Hendley.
- Page 60, line 6 from bottom, for Whitely *read* Whitley.
- Page 62, line 25, for Bann *read* Baná.
- Page 62, lines 27 and 29, for Chanda *read* Chándah.
- Page 66, line 24, for Betuia *read* Betula.
- Page 75, line 25, for Paliography *read* Palæography.
- Page 77, line 12, for Institutions Lingae *read* Institutiones Linguae.
- Page 81, line 13, for La Touch *read* La Touche.
- Page 85, line 15, for Khasia *read* Khásia.
- Page 85, line 4 from bottom, for Areano *read* Ariano.
- Page 91, line 11, for Suda *read* Soda.
- Page 97, line 13, for Capt. Lewis, *read* Capt. Lewin.
- Page 97, line 8 from bottom, for "the only female examined," etc., *read* "the only female examined was, in accordance with the usual rule, longer headed."
- Page 101, line 13, for A. Chennell *read* T. Chonnell.
- Page 112, line 27, for C. S. J. *read* C. S. I.
- Page 120, line 8, from bottom, for cervicupra *read* cervicapra.
- Page 139, line 28, for Punkabari and Dalingkot *read* Pankábárl and Dálingkot.
- Page 156, line 11, for Bonn *read* Jena.
- Page 165, line 23, for Budami inscription published in the last October number *read* Morbi Inscription published on page 258, vol. II.
- Page 170, line 38, for Plates II. III. and IV *read* Plates III. IV. and V.
- Page 200, bottom line, for F. Stoliczkana *read* T. Stoliczkana.
- Page 231, line 36, omit the comma after the words 'of the sabre-like appendage.'
- Page 233, line 3 from bottom, for S. Hypsibius *read* L. Hypsibius.

**NOTE.** The Secretaries would be obliged if authors of papers would immediately give information of any mistakes that may have occurred in printing their communications.









# Meteorological Observations.

i

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	30.065	30.139	30.014	0.125	67.0	76.3	59.4	16.9
2	.075	.146	.025	.121	67.6	76.5	60.5	16.0
3	.056	.157	.003	.134	67.8	77.3	59.8	17.5
4	29.975	.060	29.917	.143	69.3	79.5	62.0	17.5
5	.953	.032	.865	.167	66.4	75.5	62.0	13.5
6	30.016	.084	.957	.127	63.0	70.5	56.8	13.7
7	.056	.134	30.012	.122	63.6	72.0	56.9	15.1
8	29.994	.055	29.941	.114	64.4	72.4	57.3	15.1
9	.977	.033	.921	.112	65.7	74.2	58.4	15.8
10	.985	.058	.940	.118	67.7	76.8	60.5	16.3
11	.954	.032	.888	.144	69.1	78.5	62.4	16.1
12	.892	29.964	.833	.131	70.8	80.0	64.5	15.5
13	.879	.952	.833	.119	70.7	78.0	65.6	12.4
14	.879	.941	.828	.113	70.3	78.5	64.2	14.3
15	.904	.968	.860	.108	68.0	76.2	62.3	13.9
16	.883	.958	.814	.144	66.8	76.5	59.3	17.2
17	.861	.924	.824	.100	69.0	79.0	61.0	18.0
18	.805	.889	.731	.158	71.6	79.0	65.7	13.3
19	.813	.885	.726	.159	67.4	71.3	63.0	8.3
20	.881	.959	.836	.123	65.6	74.6	60.0	14.6
21	.893	.953	.837	.116	66.9	73.2	63.0	10.2
22	.978	30.057	.933	.124	63.1	71.0	56.5	14.5
23	.995	.069	.958	.111	62.2	72.0	53.8	18.2
24	.999	.065	.954	.111	63.4	73.6	54.8	18.8
25	.991	.044	.949	.095	65.7	75.0	56.4	18.6
26	30.011	.093	.958	.135	62.8	65.8	60.0	5.8
27	.028	.104	.089	.115	63.6	71.2	59.0	12.2
28	.055	.135	30.013	.122	65.3	74.2	58.5	15.7
29	.050	.136	29.993	.143	64.2	73.2	55.8	17.4
30	.013	.085	.951	.134	65.5	75.7	55.5	20.2
31	.033	.085	.978	.107	65.3	70.5	60.0	10.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



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	o	o	o	o	Inches.	T. gr.	T. gr.	
1	61.6	5.4	57.3	9.7	0.478	5.28	2.02	0.72
2	62.6	5.0	58.6	9.0	.499	.52	1.92	.74
3	62.7	5.1	58.6	9.2	.499	.52	.96	.74
4	64.2	5.1	60.1	9.2	.525	.78	2.05	.74
5	63.9	2.5	61.9	4.5	.557	6.17	1.00	.86
6	59.1	3.9	55.6	7.4	.452	5.05	.40	.78
7	59.4	4.2	55.6	8.0	.452	.04	.53	.77
8	60.1	4.3	56.2	8.2	.461	.13	.61	.76
9	61.5	4.2	58.1	7.6	.491	.44	.58	.78
10	61.1	3.6	61.2	6.5	.544	6.01	.45	.81
11	65.5	3.6	62.6	6.5	.570	.28	.50	.81
12	67.3	3.5	64.5	6.3	.607	.68	.52	.82
13	66.7	4.0	63.5	7.2	.588	.46	.72	.79
14	64.9	5.4	60.6	9.7	.534	5.86	2.22	.73
15	61.7	6.3	56.7	11.3	.469	.17	.36	.69
16	60.0	6.8	54.6	12.2	.437	4.84	.42	.67
17	64.3	4.7	60.5	8.5	.532	5.86	1.90	.76
18	68.1	3.5	65.3	6.3	.623	6.85	.55	.82
19	65.3	2.1	63.6	3.8	.590	.52	0.87	.88
20	63.0	2.6	60.9	4.7	.539	5.98	1.02	.85
21	62.8	4.1	59.5	7.4	.515	.70	.58	.78
22	54.7	8.4	47.1	16.0	.338	3.77	2.70	.58
23	54.8	7.4	48.1	14.1	.350	.91	.38	.62
24	56.7	6.7	50.7	12.7	.382	4.27	.26	.65
25	59.1	6.6	53.8	11.9	.425	.71	.31	.67
26	60.3	2.5	58.0	4.8	.489	5.45	0.96	.85
27	61.3	2.3	59.2	4.4	.509	.68	.89	.87
28	60.5	4.8	56.7	8.6	.469	.19	1.74	.75
29	57.5	6.7	51.5	12.7	.493	4.37	2.32	.65
30	58.5	7.0	52.9	12.6	.412	.58	.40	.66
31	60.3	5.0	56.3	9.0	.462	5.14	1.79	.74

All the Hygrometrical elements are computed by the Greenwich Constants.



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	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	30.065	30.139	30.014	0.125	67.0	76.3	59.4	16.9
2	.075	.146	.025	.121	67.6	76.5	60.5	16.0
3	.056	.137	.003	.134	67.8	77.3	59.8	17.5
4	29.975	.060	29.917	.143	69.3	79.5	62.0	17.5
5	.953	.032	.865	.167	66.4	75.5	62.0	13.5
6	30.016	.084	.957	.127	63.0	70.5	56.8	13.7
7	.056	.134	30.012	.122	63.6	72.0	56.9	15.1
8	29.994	.055	29.941	.114	64.4	72.4	57.3	15.1
9	.977	.033	.921	.112	65.7	74.2	58.4	15.8
10	.985	.058	.940	.118	67.7	76.8	60.5	16.3
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20	.881	.959	.836	.123	65.6	74.6	60.0	14.6
21	.893	.953	.837	.116	66.9	73.2	63.0	10.2
22	.978	30.057	.933	.124	63.1	71.0	56.5	14.5
23	.995	.069	.958	.111	62.2	72.0	53.8	18.2
24	.999	.065	.954	.111	63.4	73.6	54.8	18.8
25	.991	.044	.949	.095	65.7	75.0	56.4	18.6
26	30.011	.093	.958	.135	62.8	65.8	60.0	5.8
27	.028	.104	.989	.115	63.6	71.2	59.0	12.2
28	.055	.135	30.013	.122	65.3	74.2	58.5	15.7
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	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	60.9	2.7	58.5	5.1	0.498	5.54	1.03	0.84
1	60.5	2.5	58.2	4.8	.493	.49	0.96	.85
2	60.1	2.4	57.9	4.6	.488	.44	.91	.86
3	59.6	2.3	57.5	4.4	.481	.39	.84	.87
4	59.1	2.3	57.0	4.4	.473	.30	.84	.86
5	58.7	2.3	56.6	4.4	.467	.24	.82	.87
6	58.4	2.1	56.5	4.0	.465	.22	.75	.87
7	58.1	2.0	56.3	3.8	.462	.19	.70	.88
8	59.1	2.3	57.0	4.4	.473	.30	.84	.86
9	60.8	3.8	57.8	6.8	.486	.40	1.38	.80
10	62.5	5.2	58.3	9.4	.494	.46	2.00	.73
11	63.4	6.6	58.1	11.9	.491	.40	.60	.68
Noon.	63.7	8.2	57.1	14.8	.475	.20	3.28	.61
1	63.9	9.1	56.6	16.4	.467	.11	.65	.58
2	64.2	9.8	57.3	16.7	.478	.21	.83	.58
3	64.2	10.0	57.2	17.0	.476	.19	.90	.57
4	63.5	9.5	55.9	17.1	.456	4.98	.78	.57
5	63.7	8.1	57.2	14.6	.476	5.21	.24	.62
6	63.8	5.7	59.2	10.3	.509	.62	2.26	.71
7	63.4	4.5	59.8	8.1	.520	.74	1.77	.76
8	62.9	3.8	59.9	6.8	.521	.77	.46	.80
9	62.4	3.4	59.7	6.1	.518	.75	.29	.82
10	61.9	3.1	59.4	5.6	.513	.69	.18	.83
11	61.4	2.8	58.9	5.3	.504	.61	.08	.84

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid- night.	29.966	30.078	29.757	0.321	63.6	71.0	57.2	13.8
1	.959	.071	.751	.320	63.0	70.5	56.7	13.8
2	.951	.062	.738	.324	62.5	70.0	56.1	13.9
3	.943	.053	.730	.323	61.9	69.0	55.5	13.5
4	.939	.059	.726	.333	61.4	68.5	55.0	13.5
5	.947	.054	.735	.319	61.0	68.0	54.5	13.5
6	.962	.072	.751	.321	60.5	67.5	54.1	13.4
7	.981	.092	.792	.300	60.1	65.7	53.8	11.9
8	30.005	.114	.824	.290	61.4	68.0	55.7	12.3
9	.032	.146	.856	.290	64.6	72.0	60.4	11.6
10	.036	.140	.879	.261	67.7	75.4	61.7	13.7
11	.009	.121	.868	.253	70.0	76.0	63.5	12.5
Noon.	29.990	.095	.824	.271	71.9	79.0	63.5	15.5
1	.961	.067	.787	.280	73.0	78.8	63.3	15.5
2	.937	.041	.762	.279	74.0	79.0	61.5	17.5
3	.925	.025	.732	.293	74.2	80.0	61.0	19.0
4	.922	.030	.743	.287	73.0	78.0	61.0	17.0
5	.929	.045	.735	.310	71.8	76.2	60.5	15.7
6	.939	.052	.731	.321	69.5	73.5	60.0	13.5
7	.953	.069	.747	.322	67.9	72.7	60.0	12.7
8	.966	.089	.764	.325	66.7	71.7	60.5	11.2
9	.974	.094	.754	.340	65.8	71.5	60.2	11.3
10	.976	.098	.765	.333	65.0	71.2	58.8	12.4
11	.973	.093	.765	.328	64.2	71.6	58.0	13.6

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of January 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
14	126.0	...	S E, E S E & N	...	56.1	Scuds to 7 A. M., \i to 9 A. M. B to Noon, \i to 2 P. M., \i to 4 P. M. B to 11 P. M.
15	121.0	...	NE, N by E & NNE	...	96.9	B to 4 A. M., \i to 6 A. M. B to 11 P. M. Slightly foggy from 7 to 9 P. M.
16	128.8	...	N E & S by W	...	88.0	B to 2 P. M., \i to 5 P. M., \i to 7 P. M. B to 11 P. M. Slightly foggy from 7 to 10 P. M.
17	130.0	0.06	S by W & S S W	...	94.9	B to 4 A. M., \i to 6 P. M. B to 8 P. M., \i to 11 P. M. Light R between 4 & 5 P. M.
18	130.5	...	S S W & S W	5.2	180.3	B to 5 A. M., \i to 11 P. M. Brisk wind from 12½ to 6 P. M. T at 3½ & 9½ P. M. Sheet L at 8 & 9 P. M. D at 3½ & 8 P. M.
19	113.0	...	W by N & E by N	...	244.3	B to 6 A. M. S to 11 A. M. O to 2 P. M. B to 11 P. M. Foggy from 7 to 11 A. M.
20	127.0	...	E by N & E N E	...	116.4	S to 7 A. M. O to 11 A. M., \i to 5 P. M., \i to 8 P. M. Scuds to 11 P. M. Foggy from 2 to 6 A. M.
21	123.5	...	N E & N W	...	161.8	Clouds of different kinds.
22	129.5	...	NNW, N & N by E	...	198.4	\i to 1 A. M. B to 11 P. M.
23	124.5	...	N by E & N W	...	91.1	B. Slightly foggy from to 7 11 P. M.
24	132.0	...	N W, N by W & E [NE]	...	52.0	B. Foggy from Midnight to 6 A. M. & 7 to 11 P. M.
25	122.0	...	E by N, S by W & [SSE]	...	17.0	B to 8 A. M., \i to 11 P. M. Slightly foggy at midnight & 1 & from 5 to 8 A. M. D at 6 P. M.
26	...	0.18	S S E & E	...	23.8	\i to 3 A. M. O to 11 P. M. Light R from 8 A. M. to 5 P. M.
27	119.2	...	E & E N E	...	51.2	O to 10 A. M., \i to 6 P. M. B to 11 P. M. Slightly foggy from 8 to 11 P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning R. rain, D. drizzle.



*Meteorological Observations.*

v

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<sup>o</sup>	Inches		lb	Mile.	
1	125.5	...	N W & N by W	...	116.3	B. Slightly foggy from 7 to 10 P. M.
2	132.0	...	N by W, N & N W	...	101.3	B.
3	122.3	...	N W & W N W	...	60.1	B. Slightly foggy from 8 to 11 P. M.
4	134.0	...	W N W & S S W	...	61.2	B. Sheet L on N at 11 P. M. Slightly foggy at midnight 1 A. M. & 7 P. M.
5	122.0	1.00	S by W & S E	1.4	70.8	Chiefly S. Slightly foggy at 3 & 4 A. M. Sheet L on N at midnight T & L from 1½ to 3 P. M. Hailstone at 2½ P. M. R from 2½ to 3½ & at 5½ P. M.
6	126.4	...	N N E & N N W	...	138.8	S to 1 A. M., ~i to 3 A. M. B to Noon, ~i to 4 P. M. B to 11 P. M. Slightly foggy at 10 & 11 P. M.
7	126.5	...	N N W & N	...	116.2	B to 11 A. M., ~i to 1 P. M., ~i to 4 P. M. B to 11 P. M. Slightly foggy at 7 & 8 P. M.
8	126.0	...	N by W & N W	...	59.3	B to 10 A. M., ~i to 6 P. M. B to 11 P. M. Slightly foggy from 4 to 7 A. M. & 8 to 10 P. M.
9	130.3	...	W N W & E S E	...	62.8	B to 10 A. M., ~i to 3 P. M., ~i to 5 P. M. B to 11 P. M. Slightly foggy from 6 to 8 A. M.
10	134.0	...	E S E & S E	...	36.2	B to 9 A. M., ~i to 11 A. M., ~i to 5 P. M. B to 11 P. M.
11	124.0	...	S E & S	...	71.5	B to 8 A. M. ~i to 4 P. M. B to 11 P. M.
12	129.9	...	S by W & S W	...	132.3	B to 5 A. M., ~i to 8 A. M., ~i to 11 P. M.
13	120.0	0.03	S E	...	101.2	~i to 3 A. M. B to 5 A. M. S to 7 A. M., ~i to 4 P. M., ~i to 6 P. M. B to 11 P. M. Slightly foggy from 8 to 10 P. M. Light R at 2½ & 5½ A. M.

~i Cirri, —i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi,  
~i Cirro, cumuli-B clear, S straton, O overcast, T thunder, L lightning,  
R. rain, D, drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1875.*

## MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.966
Max. height of the Barometer occurred at 9 A. M. on the 2nd ...	30.146
Min. height of the Barometer occurred at 4 A. M. on the 19th ...	29.726
<i>Extreme range</i> of the Barometer during the month ...	0.420
Mean of the daily Max. Pressures ... ..	30.038
Ditto ditto Min. ditto ... ..	29.912
<i>Mean daily range</i> of the Barometer during the month ...	0.126

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	°
Mean Dry Bulb Thermometer for the month ... ..	66.4
Max. Temperature occurred at 3 P. M. on the 12th ...	80.0
Min. Temperature occurred at 7 A. M. on the 23rd ...	53.8
<i>Extreme range</i> of the Temperature during the month ...	26.2
Mean of the daily Max. Temperature ... ..	74.8
Ditto ditto Min. ditto, ... ..	59.8
<i>Mean daily range</i> of the Temperature during the month ...	15.0

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Mean Wet Bulb Thermometer for the month ... ..	61.7
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	4.7
Computed Mean Dew-point for the month ... ..	57.9
Mean Dry Bulb Thermometer above computed mean Dew-point ...	8.5

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	Inches.
Mean Elastic force of Vapour for the month ... ..	0.488

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	Troy grain.
Mean Weight of Vapour for the month ... ..	5.39
Additional Weight of Vapour required for complete saturation ...	1.78
Mean degree of humidity for the month, complete saturation being unity	0.75

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	°
Mean Max. Solar radiation Thermometer for the month ... ..	125.0

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	Inches.
Rained 8 days,—Max. fall of rain during 24 hours ... ..	1.00
Total amount of rain during the month ... ..	1.27
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ... ..	1.04
Prevailing direction of the Wind ... N. W., S. E & N. E.	

\* Height 70 feet 10 inches above ground.



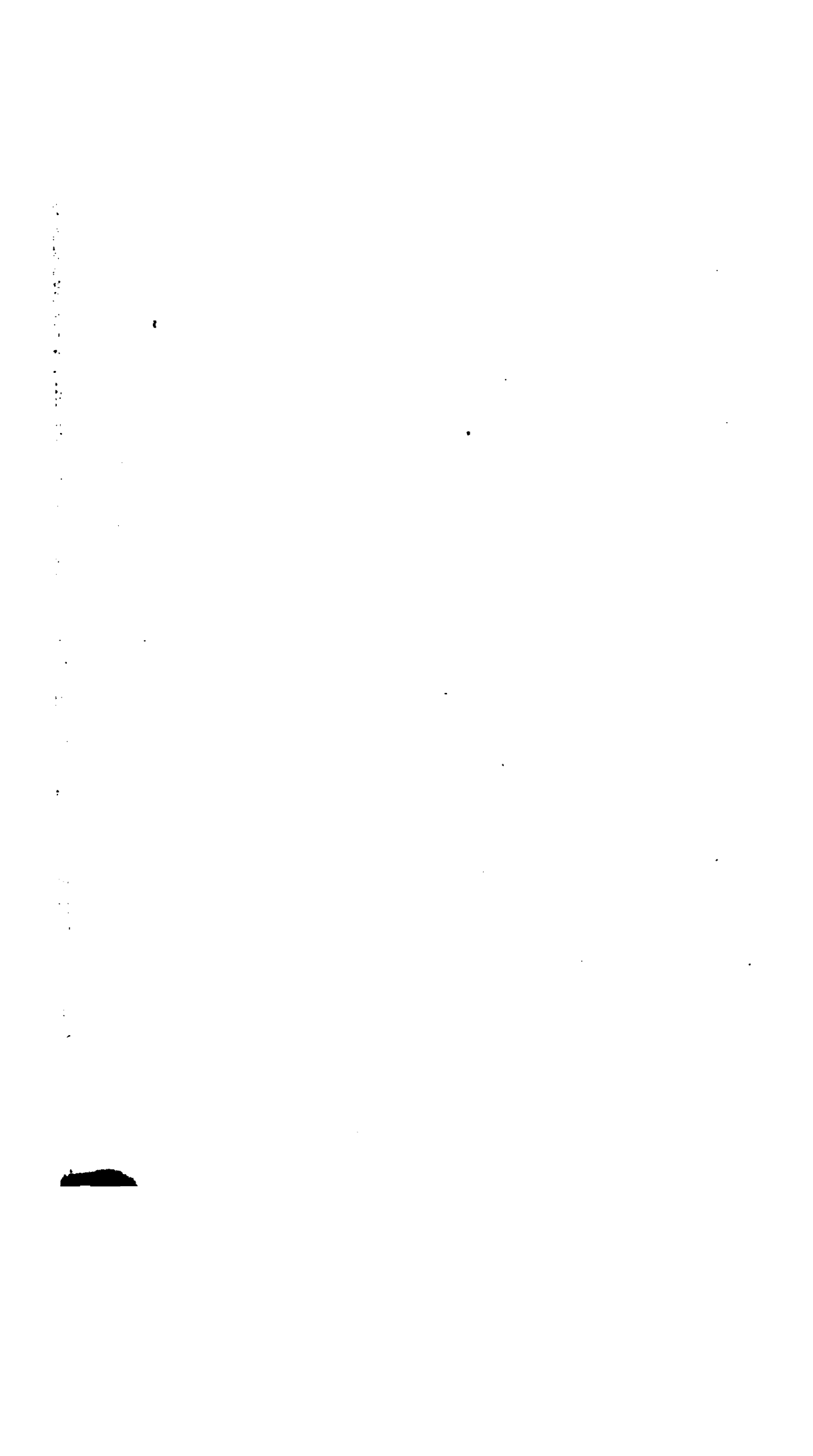
*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1875.*

Solar Radiation, Weather, &c..

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches.		lb	Miles.	
28	123.5	...	E by N & N E	...	35.6	B to 10 A. M., ~i to 1 P. M. i to 4 P. M. B to 11 P. M. Foggy at midnight
29	123.8	...	N E & N by E	...	67.1	B. Slightly foggy from 7 to 10 P. M.
30	124.5	...	N by E, NNE & SE	...	41.5	B to 7 A. M., ~i to 1 P. M. B to 3 P. M. O to 11 P. M. Slightly foggy at midnight.
31	97.5	...	SE, ENE & N	...	77.0	O to 7 A. M., ~i to 10 A. M. O to 1 P. M., ~i to 5 P. M. O to 7 P. M. B to 11 P. M. D at 4½ A. M.

~i Cirri —i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati ~i Nimb, ~i Cirro-Cumuli, B clear, S strati, O overcast, T thunder, L lightning R rain, D. drizzle.

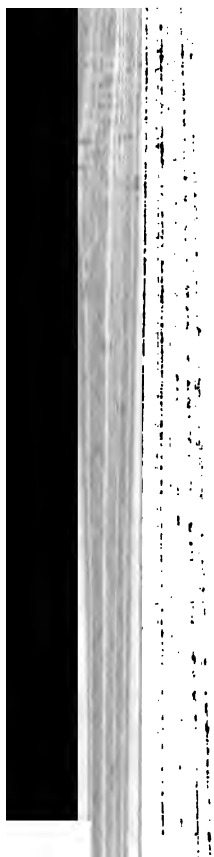














# Meteorological Observations.

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*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Falt.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	30.063	30.145	30.003	0.142	62.5	69.2	56.0	13.2
2	.042	.114	29.977	.137	63.1	72.6	54.5	18.1
3	.068	.140	30.026	.114	65.8	76.0	57.5	18.5
4	.068	.169	29.996	.173	66.2	78.0	56.0	22.0
5	.004	.079	.942	.137	68.9	81.3	58.0	23.3
6	29.986	.071	.930	.141	71.1	81.8	61.6	20.2
7	.976	.077	.909	.168	72.5	82.2	64.5	17.7
8	.953	.024	.902	.122	72.2	82.0	65.5	16.5
9	.949	.031	.886	.145	71.1	80.5	65.5	15.0
10	.938	.003	.901	.102	72.2	79.5	65.2	14.3
11	.922	.071	.938	.133	73.3	80.7	68.4	12.3
12	30.017	.106	.947	.159	71.1	80.0	63.3	16.7
13	29.973	.050	.900	.150	70.9	82.0	61.8	20.2
14	.951	.037	.893	.141	73.4	85.2	63.5	21.7
15	.938	.017	.860	.157	75.3	87.7	65.5	22.2
16	.899	29.971	.836	.135	75.5	88.0	66.9	21.1
17	.922	.988	.867	.121	71.1	80.0	63.5	16.5
18	.979	30.062	.917	.145	69.9	78.5	61.8	16.7
19	.963	.044	.914	.130	70.8	80.0	62.5	17.5
20	.986	.055	.929	.126	72.2	82.5	62.5	20.0
21	.976	.064	.917	.147	73.3	84.4	63.5	20.9
22	.932	.004	.867	.137	75.6	86.2	65.0	21.2
23	.897	29.963	.847	.116	77.2	88.7	68.5	20.2
24	.882	.945	.833	.112	78.5	88.8	70.0	18.8
25	.933	30.007	.890	.117	78.5	87.8	70.7	17.1
26	.962	.047	.910	.137	75.4	84.8	66.8	18.0
27	.907	29.996	.825	.171	74.1	85.5	64.5	21.0
28	.854	.940	.796	.144	74.6	86.5	65.3	21.2

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity.
	°	°	°	°	Inches.	T. gr.	T. gr.	°
1	56.8	5.7	51.7	10.8	0.396	4.42	1.93	0
2	57.5	5.6	52.5	10.6	.407	.54	.93	
3	58.6	7.2	52.8	13.0	.411	.56	2.48	
4	58.9	7.3	53.1	13.1	.415	.61	.51	
5	61.6	7.3	55.8	13.1	.455	5.02	.72	
6	63.9	7.2	58.1	13.0	.491	.39	.89	
7	65.7	6.8	60.3	12.2	.528	.79	.84	
8	65.7	6.5	60.5	11.7	.532	.83	.72	
9	65.8	5.3	61.6	9.5	.552	6.05	.23	
10	68.5	3.7	65.5	6.7	.628	.88	1.67	
11	65.5	7.8	59.3	14.0	.511	5.58	3.26	
12	63.2	7.9	56.9	14.2	.472	.17	.11	
13	62.1	8.8	55.1	15.8	.444	4.88	.35	
14	65.0	8.4	58.3	15.1	.494	5.39	.48	
15	65.9	9.4	59.3	16.0	.511	.56	.84	
16	66.0	9.5	59.3	16.2	.511	.56	.90	
17	61.3	9.8	53.5	17.6	.421	4.62	.66	
18	61.6	8.3	55.0	14.9	.442	.87	.11	
19	63.2	7.6	57.1	13.7	.475	5.21	2.99	
20	63.9	8.3	57.3	14.9	.478	.23	3.32	
21	65.2	8.1	58.7	14.6	.501	.47	.37	
22	67.6	8.0	62.0	13.6	.559	6.08	.40	
23	69.3	7.9	63.8	13.4	.593	.44	.51	
24	69.4	9.1	63.0	15.5	.578	.24	4.11	
25	68.7	9.8	61.8	16.7	.555	.00	.35	
26	64.0	11.4	56.0	19.4	.458	4.98	.45	
27	62.5	11.6	54.4	19.7	.434	.72	.35	
28	64.4	10.2	57.3	17.3	.478	5.21	3.99	

All the Hygrometrical elements are computed by the Greenwich Constant



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahrt.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.968	30.073	29.859	0.214	67.7	74.5	60.0	14.5
1	.961	.070	.849	.221	66.9	74.0	59.2	14.8
2	.954	.068	.838	.230	66.2	73.5	58.0	15.5
3	.944	.067	.824	.243	65.5	73.0	57.0	16.0
4	.942	.062	.835	.227	64.9	72.2	56.2	16.0
5	.955	.077	.853	.224	64.4	71.5	55.5	16.0
6	.973	.098	.873	.225	63.8	70.7	54.5	16.2
7	.991	.112	.887	.225	63.6	71.0	54.5	16.5
8	30.013	.130	.908	.222	65.6	73.5	55.5	18.0
9	.031	.156	.933	.223	70.0	78.5	59.5	19.0
10	.013	.169	.940	.229	73.8	81.5	62.0	19.5
11	.030	.144	.931	.213	76.6	84.0	64.2	19.8
noon.	.002	.114	.898	.216	78.8	85.0	66.4	18.6
1	29.970	.080	.866	.214	80.2	87.2	67.5	19.7
2	.939	.052	.830	.222	81.3	88.3	68.6	19.7
3	.920	.042	.803	.239	82.0	88.8	69.2	19.6
4	.910	.035	.802	.233	81.7	88.8	68.8	20.0
5	.911	.013	.796	.247	80.5	88.0	68.5	19.5
6	.916	.048	.796	.252	77.5	84.0	66.2	17.8
7	.929	.062	.804	.258	74.6	81.0	64.0	17.0
8	.946	.084	.819	.265	72.7	79.5	63.0	16.5
9	.961	.091	.841	.250	71.2	78.0	62.3	15.7
10	.969	.091	.850	.311	69.9	76.0	61.5	14.5
11	.969	.093	.853	.240	68.8	75.0	61.0	14.0

3.

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	63.1	4.6	59.4	8.3	0.513	5.67	1.59	0.76
1	62.6	4.3	59.2	7.7	.509	.64	.64	.78
2	62.1	4.1	58.8	7.4	.503	.57	.55	.78
3	61.7	3.8	58.7	6.8	.501	.56	.42	.80
4	61.3	3.6	58.4	6.5	.496	.50	.35	.80
5	61.0	3.4	57.9	6.5	.488	.41	.33	.80
6	60.7	3.1	57.9	5.9	.488	.42	.19	.82
7	60.5	3.1	57.7	5.9	.485	.39	.18	.82
8	61.3	4.3	57.9	7.7	.488	.40	.60	.77
9	62.8	7.2	57.0	13.0	.473	.20	2.80	.65
10	63.9	9.9	57.0	16.8	.473	.16	3.82	.58
11	64.9	11.7	56.7	19.9	.469	.08	4.69	.52
Noon.	65.5	13.3	56.2	22.6	.461	4.97	5.47	.48
1	66.1	14.1	56.2	24.0	.461	.96	.92	.46
2	66.3	15.0	55.8	25.5	.455	.89	3.35	.44
3	66.6	15.4	55.8	26.2	.455	.89	.58	.43
4	66.4	15.3	55.7	26.0	.453	.87	.50	.43
5	66.2	14.3	56.2	24.3	.461	.96	.02	.45
6	67.1	10.4	59.8	17.7	.520	5.62	4.42	.56
7	68.3	8.3	60.5	14.1	.532	.80	3.40	.63
8	65.7	7.0	60.1	12.6	.525	.74	2.94	.66
9	65.0	6.2	60.0	11.2	.523	.74	.56	.69
10	64.6	5.3	60.4	9.5	.530	.83	.15	.73
11	63.9	4.9	60.0	8.8	.523	.76	1.95	.75

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Mile.	
1	119.0	...	N,NW&WNW	0.1	90.6	B.
2	118.0	...	N W & N by E	...	126.0	B. to 4 p. m., \i to 6 p. m. B to 11 p. m.
3	122.0	...	N by E & N W	...	73.1	B Slightly foggy at 8 p. m.
4	131.0	...	N W & N N W	...	40.1	B to 6 a. m., \i to 7 p. m. B to 11 p. m. Foggy from 8 to 11 p. m.
5	124.0	...	N N W & N by E	...	17.3	B to 4 a. m., \i to 4 p. m. B to 11 p. m. Foggy at midnight from 5 to 7 a. m. & 7 to 11 p. m.
6	126.0	...	N N W	...	47.8	B to 4 p. m., \i to 6 p. m. B to 11 p. m. Slightly foggy at midnight & 1 a. m. & from 8 to 11 p. m.
7	133.0	...	N N W & S E	...	28.2	B to 5 a. m., \i to 8 a. m. B to 11 p. m. Slightly foggy at midnight.
8	127.5	...	S E & N N E	...	22.0	B to 3 a. m., \i to 9 p. m. B to 11 p. m. Sheet L on N at 8 p. m. D at 9 p. m.
9	126.0	...	N by E & S by W	...	68.3	B to 3 a. m., S to 7 a. m. \i to 2 p. m., \i to 6 p. m. B to 11 p. m. D at 10½ a. m.
10	122.5	...	S by W & S W	...	36.7	B to 4 a. m., \i to 10 a. m., \i to 4 p. m., \i to 6 p. m., \i to 8 p. m. B to 11 p. m.
11	125.5	...	S W & N E	...	62.5	Chiefly B. D at 2½ a. m.
12	123.8	...	N E & W N W	...	19.1	B. to 7 a. m., \i to 11 p. m. Slightly foggy at 9 & 10 p. m.
13	127.0	...	N W & N N W	...	22.2	\i to 11 a. m., B to 1 p. m., \i to 11 p. m. Foggy from 7 to 11 p. m.
14	130.4	...	W N W	...	4.9	\i to 1 a. m. B to 11 p. m. Slightly foggy at 9 p. m.
15	132.6	...	S W & S	...	9.3	B to Noon, \i to 11 p. m.
16	135.0	...	SSW,SW&WSW	...	43.9	\i to Noon, B to 11 p. m.
17	127.0	...	N N E & N	...	132.1	B.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro, cumuli-B clear, S strati, O overcast, T thunder, L lightning, R. rain, D, drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of February 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Mies.	
18	123.3	...	N & NE	...	62.4	B to 8 P. M., \i to 11 P. M.
19	122.7	...	NW, NE & ENE	...	22.4	Slightly foggy from 9 to 11 P. M. \i to 1 A. M. B to 11 P. M.
20	127.5	...	E NE & E by N	...	14.4	Foggy at midnight & 1 A. M. & 8 to 11 P. M.
21	131.5	...	E NE	...	15.8	B. Slightly foggy from mid- night to 2 A. M. & 9 to 11 P. M.
22	133.5	...	E NE & S W	...	12.8	B. Slightly foggy from 8 to 11 P. M.
23	132.5	...	[by N S W, W S W & W	...	8.0	B. B to 7 A. M., \i to 11 P. M.
24	133.0	...	W	...	13.8	\i to 1 A. M., \i to 6 A. M. B to 2 P. M., \i to 5 P. M., \i to 11 P. M.
25	131.4	...	W	...	54.6	\i to 2 A. M. B to 2 P. M. \i to 4 P. M. B to 11 P. M.
26	130.0	...	W & W N W	...	30.6	B
27	131.8	...	W by S, W & W by N	...	18.7	B
28	135.0	...	W S W & W	...	39.5	B

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,  
\i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning  
R. rain, D. drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1875.*

MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.965
Max. height of the Barometer occurred at 10 A. M. on the 4th ...	30.169
Min. height of the Barometer occurred at 5 & 6 P. M. on the 28th ...	29.796
Extreme range of the Barometer during the month ... ..	0.373
Mean of the daily Max. Pressures ... ..	30.044
Ditto ditto Min. ditto ... ..	29.906
Mean daily range of the Barometer during the month ... ..	0.138

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	°
Mean Dry Bulb Thermometer for the month ... ..	72.0
Max. Temperature occurred at 3 & 4 P. M. on the 24th ... ..	88.8
Min. Temperature occurred at 6 & 7 A. M. on the 2nd ... ..	54.5
Extreme range of the Temperature during the month ... ..	34.3
Mean of the daily Max. Temperature ... ..	82.2
Ditto ditto Min. ditto, ... ..	63.5
Mean daily range of the Temperature during the month ... ..	18.7

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Mean Wet Bulb Thermometer for the month ... ..	64.0
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	8.0
Computed Mean Dew-point for the month ... ..	57.6
Mean Dry Bulb Thermometer above computed mean Dew-point ... ..	14.4

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.483

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	Troy grain.
Mean Weight of Vapour for the month ... ..	5.29
Additional Weight of Vapour required for complete saturation ... ..	3.21
Mean degree of humidity for the month, complete saturation being unity	0.62

	°
Mean Max. Solar radiation Thermometer for the month ... ..	127.9

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	Inches.
Drizzled 3 days,—Max. fall of rain during 24 hours ... ..	Nil
Total amount of rain during the month ... ..	Nil
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	Nil
Prevailing direction of the Wind ... E. N. E. N. N. W. & N. W.	

\* Height 70 feet 10 inches above ground.



### MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahit.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.867	29.927	29.822	0.105	76.1	88.2	67.7	20.5
2	.899	.973	.847	.126	77.7	87.4	71.3	16.1
3	.912	.997	.842	.155	78.1	88.0	71.5	16.5
4	.926	30.003	.870	.133	78.9	89.0	71.5	17.5
5	.966	.044	.909	.135	79.4	91.0	71.3	19.7
6	.930	.013	.856	.157	80.1	92.0	73.0	19.0
7	.810	29.921	.762	.159	81.5	94.0	73.0	21.0
8	.797	.884	.734	.150	81.9	92.5	73.9	18.6
9	.786	.856	.728	.128	81.2	94.5	70.0	24.5
10	.757	.833	.685	.148	81.8	91.6	75.5	16.1
11	.724	.790	.642	.148	82.4	93.5	74.5	19.0
12	.722	.780	.668	.112	82.3	91.5	77.0	14.5
13	.713	.767	.653	.114	82.7	91.0	77.0	14.0
14	.771	.835	.701	.134	83.0	92.7	77.4	15.3
15	.787	.880	.705	.175	82.9	91.8	77.5	14.3
16	.784	.844	.733	.111	83.0	90.5	78.5	12.0
17	.813	.871	.762	.109	82.7	92.5	76.2	16.3
18	.808	.866	.751	.115	82.2	90.3	76.5	13.8
19	.842	.919	.784	.135	82.8	93.0	75.7	17.3
20	.850	.933	.772	.161	83.2	92.5	74.5	18.0
21	.848	.928	.770	.158	84.0	93.5	77.0	16.5
22	.834	.921	.731	.190	82.3	92.9	75.7	17.2
23	.808	.878	.705	.173	81.5	92.3	73.5	18.8
24	.809	.875	.738	.137	80.4	91.0	73.5	17.5
25	.789	.857	.722	.135	82.3	92.0	75.5	16.5
26	.766	.820	.662	.158	81.4	90.5	72.9	17.6
27	.809	.869	.750	.119	81.5	90.5	73.0	17.5
28	.836	.922	.731	.188	82.9	92.3	76.5	15.8
29	.838	.902	.777	.125	83.3	92.3	76.0	16.3
30	.818	.882	.747	.135	84.0	93.2	77.3	15.9
31	.801	.874	.722	.152	84.7	96.5	76.0	20.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	68.9	7.2	63.9	12.2	0.595	6.47	3.16	0.67
2	73.4	4.3	70.4	7.3	.736	7.99	2.11	.79
3	73.4	4.7	70.1	8.0	.729	.90	.32	.77
4	74.0	4.9	70.6	8.3	.741	8.02	.45	.77
5	72.1	7.3	67.0	12.4	.659	7.12	3.50	.67
6	72.1	8.0	66.5	13.6	.648	6.99	.85	.65
7	74.1	7.4	68.9	12.6	.701	7.54	.77	.67
8	69.8	12.1	61.3	20.6	.546	5.86	5.58	.51
9	69.9	11.3	62.0	19.2	.559	6.01	.20	.54
10	74.8	7.0	69.9	11.9	.725	7.79	3.61	.68
11	73.3	9.1	66.9	15.5	.657	.05	4.56	.61
12	74.7	7.6	69.4	12.9	.713	.66	3.92	.66
13	77.7	5.0	74.2	8.5	.832	8.93	2.79	.76
14	77.6	5.4	73.8	9.2	.822	.82	3.00	.75
15	77.6	5.3	73.9	9.0	.824	.85	2.94	.75
16	77.6	5.4	73.8	9.2	.822	.82	3.00	.75
17	77.4	5.3	73.7	9.0	.819	.80	2.92	.75
18	77.2	5.0	73.7	8.5	.819	.80	.74	.76
19	77.8	5.0	74.3	8.5	.835	.96	.79	.76
20	76.9	6.3	72.5	10.7	.787	.44	3.45	.71
21	77.8	6.2	73.5	10.5	.814	.70	.47	.72
22	75.0	7.3	69.9	12.4	.725	7.79	.79	.67
23	74.3	7.2	69.3	12.2	.711	.64	.67	.68
24	74.2	6.2	69.9	10.5	.725	.80	.14	.71
25	76.8	5.5	72.9	9.4	.797	8.57	.01	.74
26	75.7	5.7	71.7	9.7	.768	.26	.01	.73
27	76.2	5.3	72.5	9.0	.787	.47	2.84	.75
28	77.7	5.2	74.1	8.8	.830	.91	.88	.76
29	77.4	5.9	73.3	10.0	.809	.66	3.27	.73
30	77.9	6.1	73.6	10.4	.817	.75	.42	.72
31	77.6	7.1	72.6	12.1	.790	.45	.97	.68

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid- night.	29.831	29.984	29.730	0.254	77.0	80.0	69.6	10.4
1	.820	.971	.713	.258	76.6	79.8	69.2	10.6
2	.808	.948	.701	.247	76.3	80.0	69.0	11.0
3	.796	.928	.690	.238	76.0	80.0	68.7	11.3
4	.796	.930	.679	.251	75.6	80.0	68.0	12.0
5	.810	.947	.687	.260	75.3	79.3	67.7	11.6
6	.828	.961	.707	.254	75.0	78.5	67.7	10.8
7	.851	.993	.718	.275	75.1	78.5	67.8	10.7
8	.873	30.012	.736	.276	76.9	80.5	69.5	11.0
9	.889	.037	.763	.274	80.3	84.6	73.0	11.6
10	.889	.044	.767	.277	83.4	87.5	76.8	10.7
11	.877	.024	.756	.268	86.6	92.0	80.0	12.0
Noon.	.852	.002	.733	.269	88.6	93.5	82.6	10.9
1	.821	29.971	.701	.270	90.2	95.2	84.0	11.2
2	.790	.946	.674	.272	91.3	96.5	86.0	10.5
3	.767	.925	.658	.267	91.6	96.5	87.4	9.1
4	.756	.917	.647	.270	90.9	96.0	86.0	10.0
5	.757	.909	.642	.267	88.9	93.3	84.5	8.8
6	.767	.924	.647	.277	85.8	89.5	82.0	7.5
7	.793	.944	.687	.257	82.9	87.2	77.4	9.8
8	.817	.970	.711	.259	80.5	83.9	74.0	9.9
9	.835	.987	.737	.250	79.3	82.3	73.9	8.4
10	.842	.992	.747	.245	78.4	81.2	73.0	8.2
11	.839	.998	.747	.251	77.8	81.0	72.9	8.1

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb. Thermometer Means are derived from the observations made at the several hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	74.1	2.9	72.1	4.9	0.778	8.44	1.45	0.85
1	74.0	2.6	72.2	4.4	.781	.48	.29	.82
2	74.0	2.3	72.4	3.9	.785	.53	.16	.88
3	73.8	2.2	72.3	3.7	.783	.51	.09	.89
4	73.7	1.9	72.4	3.2	.785	.55	0.93	.90
5	73.5	1.8	72.2	3.1	.781	.50	.90	.90
6	73.3	1.7	72.1	2.9	.778	.48	.83	.91
7	73.5	1.6	72.4	2.7	.785	.55	.79	.92
8	74.7	2.2	73.2	3.7	.806	.75	1.11	.89
9	75.8	4.5	72.6	7.7	.790	.52	2.39	.78
10	76.4	7.0	71.5	11.9	.763	.18	3.78	.68
11	77.0	9.6	71.2	15.4	.756	.05	5.09	.61
Noon.	76.9	11.7	69.9	18.7	.725	7.68	6.24	.55
1	77.1	13.1	69.2	21.0	.708	.48	7.11	.51
2	77.0	14.3	68.4	22.9	.690	.27	.79	.48
3	77.0	14.6	68.2	23.4	.686	.23	.98	.48
4	76.6	14.3	68.0	22.9	.681	.18	.71	.48
5	76.5	12.4	69.1	19.8	.706	.47	6.57	.53
6	76.1	9.7	69.3	16.5	.711	.56	5.27	.59
7	75.4	7.5	70.1	12.8	.729	.82	3.97	.66
8	74.6	5.9	70.5	10.0	.739	.97	.01	.73
9	74.6	4.7	71.3	8.0	.758	8.20	2.39	.77
10	74.6	3.8	71.9	6.5	.773	.36	1.95	.81
11	74.5	3.3	72.2	5.6	.781	.45	.68	.83

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<sup>s</sup>	Inches		lb	Mile.	
1	135.2	...	W S W	...	58.2	B to 5, S to 9 A. M. B to 1, $\sim$ i to 3, B to 11 P. M. Foggy from 6 to 8 A. M.
2	139.0	...	W S W, & S W	1.0	78.8	B to 2, S to 8 A. M., $\sim$ i to 7, B to 11 P. M. Foggy from 3 to 8 A. M.
3	135.6	...	S W & W S W	...	34.1	B to 3, S to 9 A. M., $\sim$ i to 5, B to 11 P. M. Foggy from 4 to 9 A. M.
4	137.0	...	W S W & S W	...	66.5	B to 3, $\sim$ i to 5, B to 8 A. M., $\sim$ i to 5, B to 11 P. M.
5	140.0	...	S W	...	60.1	B to 5, $\sim$ i to 8 A. M. B to 11 P. M. Foggy at 6 & 7 A. M.
6	142.0	...	S W & W S W	...	94.4	B.
7	140.0	...	S W & S S W	0.2	116.5	B to 6, $\sim$ i to 8 A. M. B to 3, $\sim$ i to 6, $\sim$ i to 9, B to 11 P. M. D at 6 P. M.
8	135.0	...	SSW, NW & S W	0.6	59.4	B to 2, $\sim$ i to 7 A. M. B to 11 P. M.
9	137.4	...	S W & N by W	0.2	71.7	B. Slightly foggy at 6 & 7 A. M.
10	134.0	...	S	...	150.8	B to 5, $\sim$ i to 11 A. M. B to 9, $\sim$ i to 11 P. M.
11	138.0	...	S, & W by S	0.7	89.3	$\sim$ i to 1, S to 8 A. M. B to 11 P. M.
12	137.0	...	W by S & S	...	86.7	S to 7 A. M., $\sim$ i to 2, B to 11 P. M.
13	136.0	...	S by E & S	...	132.5	S to 4, O to 6 A. M. $\sim$ i to 1, B to 8, scuds to 11 P. M.
14	136.6	...	S, S S E & S by E	...	195.4	B to 4, O to 7, $\sim$ i to 9 A. M. B to 2, $\sim$ i to 5, B to 11 P. M.
15	136.0	...	S by E & S	...	152.3	B to 3, S to 9, $\sim$ i to 11 A. M. $\sim$ i to 4, B to 11 P. M.
16	135.0	...	S & S S E	...	150.0	B to 1, S to 8, $\sim$ i to 11 A. M., $\sim$ i to 1, B to 11 P. M.
17	13.0	...	S S E, S & S by E	...	151.3	B to 5, $\sim$ i to 8, B to 11 P. M.
18	132.0	...	S by E, S W, S & W	1.2	223.6	B to 11 A. M., $\sim$ i to 3, O to 9, B to 11 P. M. T & L. from 5½ to 8 P. M. D between 7 & 8 P. M.
19	138.9	...	W, S & S by W	...	190.8	Clouds of different kinds.
20	13.5	...	S by W & S	...	89.2	B to 9 A. M., $\sim$ i to 7, B to 11 P. M. Foggy at 5 & 6 A. M.
21	138.0	...	S	0.8	73.7	B to 4, O to 7, B to 10 A. M., $\sim$ i to 7, B to 11 P. M.

$\sim$  i Cirri, — i Strati,  $\sim$  i Cumuli,  $\sim$  i Cirro-strati,  $\sim$  i Cumulo-strati,  $\sim$  i Nimbi,  $\sim$  i Cirro, cumuli-B clear, S strati, O overcast, T thunder, L lightning, B. rain, D, drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of March 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Mies.	
22	139.0	...	S S E & S E	...	76.7	Chiefly B.
23	139.5	...	E by S & S E	2.0	106.5	B to 2, \i to 6, B to 8 A. M., \i to 8, B to 11 P. M. T & L between 7 & 8 P. M. D at 6½ P. M.
24	135.5	...	S E & S by E	1.3	143.1	B to 6, \i to 11 A. M., \i to 3, O to 5, S to 9, B to 11 P. M. T between 4 & 5 P. M. Sheet L from 6½ to 9 P. M.
25	138.5	...	S E & S by E	...	179.5	B to 7 A. M., \i to 4, S to 11 P. M. Sheet L on N E at 6½ P. M.
26	133.0	...	S by E, SSW & S E	4.8	210.8	S to 1, \i to 6, Scuds to 9 A. M. B to 1, \i to 11 P. M. Brisk wind from 9½ A. M. to 8 P. M. Sheet L on E at 8 P. M. D at 7 P. M.
27	137.0	...	S E & S by E	...	216.6	B to 2, Scuds to 9 A. M., \i to 2, \i to 5, S to 11 P. M.
28	131.3	...	S by E	...	107.0	B to 5 A. M. S to 9, B to 11 P. M. L on N at P. M.
29	134.5	...	S by E & S	...	102.5	B to 5, \i to 8 A. M., \i to 3, S to 11 P. M.
30	131.0	...	S & S by E	...	61.5	\i to 6, S to 11 A. M. \i to 7, B to 11 P. M. Sheet L on N E between 6 & 7 P. M.
31	133.0	...	S by E & S	...	80.5	B to 9 A. M., \i to 3. S to 6, B to 11 P. M. T at 6 P. M. L on N between 6 & 7 P. M.

\i Cirri.—i Strati. \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning R. rain, D. drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1875.*

MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.821
Max. height of the Barometer occurred at 10 A. M. on the 5th ...	30.044
Min. height of the Barometer occurred at 5 P. M. on the 11th ...	29.642
Extreme range of the Barometer during the month ... ..	0.402
Mean of the daily Max. Pressures ... ..	29.892
Ditto ditto Min. ditto ... ..	29.751
Mean daily range of the Barometer during the month ... ..	0.141

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	°
Mean Dry Bulb Thermometer for the month ... ..	81.7
Max. Temperature occurred at 2 & 3 P. M. on the 31st ... ..	96.5
Min. Temperature occurred at 5 & 6 A. M. on the 1st ... ..	67.7
Extreme range of the Temperature during the month ... ..	28.8
Mean of the daily Max. Temperature ... ..	91.8
Ditto ditto Min. ditto, ... ..	74.5
Mean daily range of the Temperature during the month ... ..	17.3

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Mean Wet Bulb Thermometer for the month ... ..	75.2
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	6.5
Computed Mean Dew-point for the month ... ..	70.6
Mean Dry Bulb Thermometer above computed mean Dew-point ... ..	11.1

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	Inches.
Mean Elastic force of Vapour for the month ... ..	0.741

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	Troy grain.
Mean Weight of Vapour for the month ... ..	7.97
Additional Weight of Vapour required for complete saturation ...	3.40
Mean degree of humidity for the month, complete saturation being unity	0.70

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	°
Mean Max. Solar radiation Thermometer for the month ... ..	136.4

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	Inches.
Drizzled 4 days,—Max. fall of rain during 24 hours ... ..	Nil
Total amount of rain during the month ... ..	Nil
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	Nil
Prevailing direction of the Wind ... .. S. by E., S. & S. W.	

\* Height 70 feet 10 inches above ground.







*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.793	29.861	29.713	0.148	83.6	93.0	77.0	16.0
2	.802	.861	.735	.126	83.3	91.5	76.7	14.8
3	.818	.884	.766	.118	83.0	92.5	75.0	17.5
4	.824	.912	.753	.159	84.2	94.6	77.0	17.6
5	.802	.872	.700	.172	84.9	93.8	78.5	15.3
6	.767	.837	.705	.132	83.1	92.8	74.0	18.8
7	.710	.772	.628	.144	86.0	96.0	78.2	17.8
8	.689	.768	.615	.153	87.2	100.0	77.8	22.2
9	.672	.744	.604	.140	87.5	100.0	78.5	21.5
10	.672	.743	.597	.146	88.2	102.0	79.0	23.0
11	.696	.776	.622	.154	88.1	100.0	80.5	19.5
12	.684	.760	.607	.153	87.9	99.0	81.0	18.0
13	.673	.739	.603	.136	87.8	98.4	80.3	18.1
14	.703	.775	.640	.135	87.8	99.4	80.0	19.4
15	.719	.798	.660	.138	87.7	98.8	80.0	18.8
16	.706	.815	.608	.207	88.5	101.5	80.0	21.5
17	.671	.762	.588	.174	89.4	102.5	80.5	22.0
18	.685	.745	.623	.122	89.1	102.2	81.3	20.9
19	.756	.829	.690	.139	88.1	99.7	80.0	19.7
20	.773	.844	.712	.132	84.8	91.8	81.5	10.3
21	.733	.796	.659	.137	85.3	93.0	80.0	13.0
22	.749	.814	.666	.148	83.1	90.0	76.0	14.0
23	.716	.782	.648	.134	81.2	92.0	73.3	18.7
24	.626	.705	.530	.175	84.3	93.8	76.0	17.8
25	.579	.635	.488	.147	84.5	95.7	75.0	20.7
26	.593	.641	.535	.106	81.1	92.5	74.5	18.0
27	.623	.686	.568	.118	78.6	88.2	73.6	14.6
28	.639	.705	.581	.124	80.5	88.9	73.9	15.0
29	.635	.692	.572	.120	85.7	93.0	80.5	12.5
30	.650	.720	.588	.132	86.2	91.6	82.8	8.8

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	78.3	5.3	74.6	9.0	.843	9.03	3.00	0.75
2	77.6	5.7	73.6	9.7	.817	8.75	.18	.73
3	78.0	5.0	74.5	8.5	.840	9.01	2.81	.76
4	78.1	6.1	73.8	10.4	.822	8.80	3.44	.72
5	78.7	6.2	74.4	10.5	.838	.95	.54	.72
6	75.7	7.4	70.5	12.6	.739	7.92	.94	.67
7	78.6	7.4	73.4	12.6	.811	8.64	4.27	.67
8	78.1	9.1	72.6	14.6	.790	.40	.97	.63
9	79.3	8.2	74.4	13.1	.838	.91	.58	.66
10	79.0	9.2	73.5	14.7	.814	.63	5.13	.63
11	80.9	7.2	76.6	11.5	.899	9.54	4.18	.70
12	81.2	6.7	77.2	10.7	.916	.73	3.91	.71
13	81.0	6.8	76.9	10.9	.908	.64	.96	.71
14	81.5	6.3	77.7	10.1	.931	.90	.70	.73
15	81.1	6.6	77.1	10.6	.913	.70	.86	.72
16	79.6	8.9	74.3	14.2	.835	8.86	5.02	.64
17	78.2	11.2	71.5	17.9	.763	.08	6.17	.57
18	79.8	9.3	74.2	14.9	.832	.82	5.30	.63
19	78.6	9.5	72.9	15.2	.797	.47	.25	.62
20	79.8	5.0	76.3	8.5	.890	9.52	2.94	.76
21	79.4	5.9	75.3	10.0	.862	.21	3.43	.73
22	76.6	6.5	72.0	11.1	.776	8.31	.55	.70
23	72.9	8.3	67.1	14.1	.661	7.12	4.09	.64
24	74.8	9.5	68.1	16.2	.684	.31	.97	.60
25	77.2	7.3	72.1	12.4	.778	8.33	.02	.67
26	75.0	6.1	70.7	10.4	.744	.02	3.15	.72
27	75.4	3.2	73.2	5.4	.806	.73	1.65	.84
28	76.9	3.6	74.4	6.1	.838	9.04	.94	.82
29	81.3	4.4	78.2	7.5	.943	10.09	2.71	.79
30	81.3	4.9	77.9	8.3	.937	.00	.99	.77

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.716	29.851	29.602	0.249	80.7	83.7	74.5	9.2
1	.704	.840	.572	.268	80.1	83.0	74.5	8.5
2	.694	.825	.566	.259	79.7	83.3	74.2	9.1
3	.685	.813	.559	.251	79.3	83.5	73.7	9.8
4	.686	.801	.560	.244	78.9	83.5	73.5	10.0
5	.701	.807	.586	.221	78.7	83.5	73.4	10.1
6	.718	.824	.594	.230	78.5	83.2	73.3	9.9
7	.739	.849	.609	.240	79.4	83.8	74.0	9.8
8	.761	.892	.622	.270	81.9	85.7	76.3	9.4
9	.772	.912	.633	.279	85.2	88.5	77.5	11.0
10	.771	.911	.630	.281	88.2	92.0	80.0	12.0
11	.760	.899	.615	.284	91.0	96.2	81.0	15.2
Noon.	.739	.873	.602	.271	93.0	98.8	83.6	15.2
1	.709	.830	.567	.263	93.9	100.6	80.5	20.1
2	.681	.800	.542	.238	94.5	101.9	83.0	18.9
3	.658	.776	.516	.260	94.8	102.5	81.4	18.1
4	.641	.771	.488	.283	94.4	102.5	85.0	17.5
5	.637	.766	.515	.251	92.2	101.2	81.0	20.2
6	.647	.772	.530	.212	88.8	96.9	74.5	22.4
7	.668	.808	.555	.253	86.1	90.3	74.5	15.8
8	.689	.824	.565	.259	83.9	87.4	75.0	12.4
9	.712	.835	.591	.244	82.7	85.5	75.5	10.0
10	.720	.861	.589	.272	81.7	84.5	75.5	9.0
11	.720	.855	.602	.253	81.3	84.0	75.2	8.8

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb. Thermometer Means are derived from the observations made at the several hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	77.6	3.1	75.4	5.3	0.865	9.34	1.70	0.85
1	77.2	2.9	75.2	4.9	.860	.28	.56	.86
2	76.9	2.8	74.9	4.8	.851	.19	.53	.83
3	76.7	2.6	74.9	4.4	.851	.21	.38	.87
4	76.6	2.3	75.0	3.9	.854	.24	.23	.88
5	76.5	2.2	75.0	3.7	.854	.24	.17	.89
6	76.5	2.0	75.1	3.4	.857	.28	.07	.90
7	77.1	2.3	75.5	3.9	.868	.38	.24	.88
8	78.3	3.6	75.8	6.1	.876	.43	3.01	.82
9	79.4	5.8	75.3	9.9	.862	.21	.40	.73
10	79.8	8.4	74.8	13.4	.849	.02	4.74	.66
11	80.0	11.0	73.4	17.6	.811	8.55	6.38	.57
Noon.	79.5	13.5	71.4	21.6	.761	7.98	7.83	.51
1	80.0	13.9	71.7	22.2	.768	8.06	8.16	.50
2	79.6	14.9	70.7	23.8	.744	7.79	.72	.47
3	79.9	14.9	71.0	23.8	.751	.85	.80	.47
4	80.4	14.0	72.0	22.4	.776	8.13	.33	.49
5	79.5	12.7	71.9	20.3	.773	.14	7.31	.53
6	79.5	9.3	73.9	14.9	.284	.74	5.26	.62
7	79.4	6.7	74.7	11.4	.846	9.03	3.92	.70
8	78.7	5.2	75.1	8.8	.857	.17	2.96	.76
9	78.3	4.4	75.2	7.5	.860	.22	.50	.78
10	77.9	3.8	75.2	6.5	.860	.24	.13	.81
11	77.8	3.5	75.3	6.0	.862	.29	1.95	.83

All the Hygrometrical elements are computed by the Greenwich Constants.



*Meteorological Observations.*

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*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches		lb	Miles.	
1	134.0	...	S & S by E	...	122.6	B to 4 A. M., \i to 6, B to 11 P. M.
2	133.0	...	E S E & S	0.8	217.9	S to 5 A. M., \i to 2, \i to 5, S to 11 P. M. T at 11 P. M. L on N W from 9 to 11 P. M.
3	134.2	1.03	S E & S S E	...	188.7	\i to 1, B to 5, \i to 8 A. M. \i to 7, S to 11 P. M. T L & R before midnight.
4	136.0	...	S S E & S by E	0.2	145.6	\i to 1, B to Noon, \i to 4, S to 8, \i to 11 P. M. Sheet L on N W at 7 & 8 P. M. D at 8 P. M.
5	134.2	...	S S E & S	...	145.0	Scuds to 3, \i to 6, \i to 10, B to Noon, \i to 4, S to 9 B to 11 P. M. T & L from 5½ to 9 P. M., D at 9 P. M.
6	133.0	...	S by W & S	...	100.4	B to 1, \i to 4, O to 6, \i to 9 A. M., \i to 5, B to 11 P. M. T, L & D at 5½ A. M.
7	140.8	...	S	...	164.5	Scuds to 8, B to 11 A. M., \i to 3, B to 11 P. M.
8	144.0	...	S	...	147.1	B.
9	143.0	...	S	...	141.9	B.
10	146.0	...	S & S S E	...	166.5	B.
11	145.0	...	S by E & S	...	174.2	B.
12	143.3	...	S & S by E	...	169.5	B to 1. Scuds to 8 A. M. B to 9, Scuds to 11 P. M.
13	145.8	...	S	...	210.0	B to 2, Scuds to 7 A. M. B to 11 P. M.
14	145.0	...	S	...	223.6	Scuds to 7 A. M. B to 11 P. M.
15	145.2	...	S	...	198.0	B to 3, S to 6 A. M. B to 11 P. M.
16	145.5	...	S	...	191.9	B to 5, Scuds to 8 A. M. B to 9, Scuds to 11 P. M.
17	147.0	...	S	...	105.6	Scuds to 2 A. M. B to 1, \i to 4, B to 9, Scuds to 11 P. M.
18	146.2	...	S	1.0	160.7	Scuds to 3 A. M. B to 3, \i to 11 P. M.
19	143.0	...	S by W & S	...	147.3	\i to 1, \i to 10 A. M. B to 1, \i to 11 P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro, cumuli-B clear, S stratoni, O overcast, T thunder, L lightning, E. rain, D, drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of April 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<sup>o</sup>	Inches		lb	Miles.	
20	125.0	...	S & S S E	...	163.5	∩i to 8 A. M. O to 2, ∩i & ∩i to 11 P. M.
21	132.0	...	S S E, S & S by E	...	153.7	∩i & ∩i to 7 A. M. S to 3, ∩i to 11 P. M.
22	129.0	...	S by E & S	...	93.3	∩i to 4 A. M. S to 7, O to 11 P. M. Sheet L at 8 P. M. D at 8½ P. M.
23	142.0	0.01	S E & E S E	...	155.3	S to 6, ∩i to 11 A. M., ∩i to 4, S to 6, ∩i & ∩i to 9, B to 11 P. M. Light R between 1 & 2 P. M.
24	138.5	...	E S E & S	...	69.7	B to 10 A. M., ∩i to 2, ∩i to 4, B to 11 P. M.
25	141.0	0.24	S E & S	...	126.5	B to 7 A. M., ∩i to 3, S to 5 O to 9, S to 11 P. M. T at 7 & 8 P. M. L from 7 to 9 P. M. R at 7 & 8½ P. M.
26	139.5	2.53	S E	...	248.6	S to 4, B to 6, Scuds to 9 A. M. ∩i to 4, O to 11 P. M. T at 2½ P. M. T & L from 5½ to 10 P. M. Hail stone at 5½ P. M. R at 2½, 3½ & from 5½ to 10 P. M.
27	141.5	0.37	...	...	199.6	O to 3, ∩i to 6 A. M., ∩i to 4, O to 11 P. M. T from Noon to 2, at 5, 7½ & 9½ P. M. L from 7 to 9 P. M. R from 11½ A. M. to 1, at 5½ 10 & 11 P. M.
28	140.0	...	S	...	69.6	Clouds of different kinds. D at Midnight.
29	139.2	...	S & S S W	1.2	107.2	S to 11 A. M., ∩i to 3. Scuds to 11 P. M. Brisk wind from Noon to 6 & 9½ to 11 P. M. Sheet L on S W from 7½ to 10 P. M.
30	139.5	...	S S W & S	5.2	208.6	Scuds Brisk wind from 7½ A. M. to 11 P. M.

∩i Cirri,—i Strati, ∩i Cumuli, ∩i Cirro-strati, ∩i Cumulo-strati, ∩i Nimbi, ∩i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning R. rain, D. drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1875.*

MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.705
Max. height of the Barometer occurred at 9 A. M. on the 4th ...	29.912
Min. height of the Barometer occurred at 4 P. M. on the 25th ...	29.488
Extreme range of the Barometer during the month ...	0.424
Mean of the daily Max. Pressures ... ..	29.776
Ditto ditto Min. ditto ... ..	29.633
Mean daily range of the Barometer during the month ...	0.143

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	°
Mean Dry Bulb Thermometer for the month ... ..	85.4
Max. Temperature occurred at 3 & 4 P. M. on the 17th ...	102.5
Min. Temperature occurred at 6 A. M. on the 23rd ...	73.3
Extreme range of the Temperature during the month ...	29.2
Mean of the daily Max. Temperature ... ..	95.6
Ditto ditto Min. ditto, ... ..	78.1
Mean daily range of the Temperature during the month ...	17.5

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Mean Wet Bulb Thermometer for the month ... ..	78.5
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	6.9
Computed Mean Dew-point for the month ... ..	73.7
Mean Dry Bulb Thermometer above computed mean Dew-point ...	11.7

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	Inches.
Mean Elastic force of Vapour for the month ... ..	0.819

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	Troy grain.
Mean Weight of Vapour for the month ... ..	8.74
Additional Weight of Vapour required for complete saturation ...	3.94
Mean degree of humidity for the month, complete saturation being unity	0.69

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	°
Mean Max. Solar radiation Thermometer for the month ... ..	140.0

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	Inches.
Rained 10 days,—Max. fall of rain during 24 hours ... ..	2.53
Total amount of rain during the month ... ..	4.18
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	3.06
Prevailing direction of the Wind ... .. S.	

\* Height 70 feet 10 inches above ground.



Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.654	29.726	29.567	0.159	86.5	92.4	82.4	10.0
2	.731	.896	.643	.253	83.9	93.0	72.5	20.5
3	.804	.912	.702	.210	80.5	89.5	72.9	16.6
4	.755	.824	.660	.164	81.3	90.0	75.0	15.0
5	.704	.775	.611	.164	81.5	90.0	74.0	16.0
6	.692	.753	.622	.131	81.0	86.0	77.0	9.0
7	.676	.726	.616	.110	82.2	91.6	77.0	14.6
8	.633	.690	.551	.139	84.4	92.2	78.0	14.2
9	.609	.689	.519	.170	84.2	92.8	75.0	17.8
10	.613	.680	.522	.158	84.3	94.0	76.5	17.5
11	.617	.668	.548	.120	85.4	94.4	77.0	17.4
12	.653	.728	.573	.155	84.6	93.5	76.5	17.0
13	.719	.789	.667	.122	84.3	92.0	75.5	16.5
14	.755	.820	.676	.144	86.4	92.8	81.4	11.4
15	.685	.747	.601	.146	87.4	93.5	82.5	11.0
16	.663	.787	.578	.209	86.7	94.3	75.5	18.8
17	.739	.824	.654	.170	83.7	92.6	75.6	16.8
18	.792	.885	.728	.157	82.8	92.5	74.8	17.7
19	.811	.879	.738	.141	81.4	91.5	75.0	16.5
20	.771	.816	.687	.129	83.5	93.7	78.5	15.2
21	.780	.840	.696	.144	85.1	91.5	78.5	16.0
22	.794	.852	.707	.145	84.8	94.0	80.2	13.8
23	.770	.841	.676	.165	85.5	94.0	79.0	15.0
24	.704	.774	.593	.181	85.9	95.0	77.7	17.3
25	.658	.732	.555	.177	84.3	93.6	77.0	16.6
26	.634	.701	.565	.136	84.0	94.7	76.0	18.7
27	.651	.704	.608	.096	81.9	93.7	73.0	20.7
28	.674	.740	.597	.143	85.4	93.5	77.8	15.7
29	.653	.733	.561	.172	86.4	94.0	80.0	14.0
30	.638	.702	.555	.147	86.9	95.2	80.5	14.7
31	.608	.677	.531	.146	88.1	96.0	83.0	13.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	81.3	5.2	78.2	8.3	0.946	10.09	3.01	0.77
2	78.2	5.7	74.2	9.7	.832	8.91	.22	.74
3	73.9	6.6	69.3	11.2	.711	7.66	.32	.70
4	75.6	5.7	71.6	9.7	.766	8.23	.01	.73
5	75.3	6.2	71.0	10.5	.751	.07	.24	.71
6	76.4	4.6	73.2	7.8	.806	.68	2.46	.78
7	77.4	4.8	74.0	8.2	.827	.90	.64	.77
8	78.7	5.7	74.7	9.7	.846	9.05	3.26	.74
9	79.2	5.0	75.7	8.5	.873	.34	2.90	.76
10	78.7	5.6	74.8	9.5	.849	.07	3.21	.74
11	79.3	6.1	75.0	10.4	.854	.12	.56	.72
12	77.9	6.7	73.2	11.4	.806	8.63	.76	.70
13	79.4	4.9	76.0	8.3	.882	9.45	2.83	.77
14	81.1	5.3	77.4	9.0	.922	.83	3.23	.75
15	82.2	5.2	79.1	8.3	.973	10.36	.09	.77
16	80.8	5.9	77.3	9.4	.919	9.80	.38	.74
17	77.1	6.6	72.5	11.2	.787	8.44	.63	.70
18	76.8	6.0	72.6	10.2	.790	.49	.26	.72
19	75.5	5.9	71.4	10.0	.761	.18	.09	.73
20	78.3	5.2	74.7	8.8	.846	9.06	2.94	.76
21	78.6	6.5	74.0	11.1	.827	8.84	3.73	.70
22	78.9	5.9	74.8	10.0	.849	9.07	.39	.73
23	79.1	6.4	74.6	10.9	.843	.00	.72	.71
24	79.1	6.8	74.3	11.6	.835	8.90	.97	.69
25	78.6	5.7	74.6	9.7	.843	9.02	.26	.74
26	77.9	6.1	73.6	10.4	.817	8.75	.42	.72
27	76.6	5.3	72.9	9.0	.797	.57	2.87	.75
28	79.4	6.0	75.2	10.2	.860	9.18	3.50	.72
29	80.5	5.9	76.4	10.0	.893	.53	.53	.73
30	86.3	6.6	76.3	10.6	.890	.48	.77	.72
31	82.0	6.1	78.3	9.8	.949	10.07	.65	.73

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.708	29.862	29.573	0.289	79.4	83.9	72.9	11.0
1	.694	.836	.579	.257	79.3	83.5	74.7	8.8
2	.684	.797	.584	.213	79.3	84.0	74.5	9.5
3	.677	.778	.577	.201	79.0	84.0	74.5	9.5
4	.680	.815	.582	.233	78.7	83.5	73.0	10.5
5	.698	.863	.592	.271	78.6	83.0	74.0	9.0
6	.714	.896	.609	.287	78.8	83.0	74.5	8.5
7	.734	.912	.631	.281	80.1	84.3	74.5	9.8
8	.749	.881	.655	.226	82.7	86.5	74.5	12.0
9	.757	.879	.666	.213	85.6	89.3	77.5	11.8
10	.756	.873	.668	.205	88.0	91.4	81.0	10.4
11	.745	.861	.649	.212	89.4	92.8	78.5	14.3
Noon.	.728	.844	.636	.208	90.8	94.3	79.3	15.0
1	.701	.825	.594	.231	91.9	94.5	82.5	12.0
2	.673	.793	.565	.228	92.5	95.5	84.7	10.8
3	.649	.771	.551	.220	92.1	96.0	84.0	12.0
4	.626	.754	.528	.226	91.0	95.7	83.0	12.7
5	.619	.740	.519	.221	89.8	93.5	81.3	12.2
6	.636	.759	.544	.215	87.7	92.0	81.5	10.5
7	.664	.798	.566	.232	85.2	89.5	76.5	13.0
8	.695	.824	.582	.242	83.2	87.3	72.5	14.8
9	.712	.822	.601	.221	81.1	86.0	73.5	12.5
10	.724	.862	.616	.246	80.3	85.4	73.5	11.9
11	.723	.896	.603	.293	79.6	84.5	72.5	12.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observation  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical element  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid. night.	75.8	3.6	73.3	6.1	0.809	8.73	1.89	0.8
1	75.9	3.4	73.5	5.8	.814	.79	.80	.8
2	75.9	3.4	73.5	5.8	.814	.79	.80	.8
3	76.0	3.0	73.9	5.1	.824	.92	.58	.8
4	75.9	2.8	73.9	4.8	.824	.92	.49	.8
5	76.1	2.5	74.3	4.3	.835	9.05	.33	.8
6	76.4	2.4	74.7	4.1	.846	.16	.28	.8
7	77.5	2.6	75.7	4.4	.873	.43	.41	.8
8	78.9	3.8	76.2	6.5	.887	.52	2.20	.8
9	80.0	5.6	76.1	9.5	.885	.44	3.32	.7
10	80.9	7.1	76.6	11.4	.899	.56	4.12	.7
11	81.1	8.3	76.1	13.3	.885	.38	.87	.6
Noon.	81.5	9.3	75.9	14.9	.879	.28	5.56	.6
1	81.7	10.2	75.6	16.3	.871	.18	6.14	.6
2	81.9	10.6	75.5	17.0	.868	.14	.45	.5
3	81.2	10.9	74.7	17.4	.846	8.92	.49	.5
4	80.8	10.2	74.7	16.3	.846	.93	.00	.6
5	80.5	9.3	74.9	14.9	.851	9.00	5.42	.6
6	80.0	7.7	75.4	12.3	.865	.20	4.36	.6
7	79.1	6.1	74.8	10.4	.849	.07	3.54	.7
8	78.0	5.2	74.4	8.8	.838	8.99	2.90	.7
9	76.8	4.3	73.8	7.3	.822	.85	.32	.7
10	76.3	4.0	73.5	6.8	.814	.78	.13	.8
11	75.9	3.7	73.3	6.3	.809	.73	1.36	.8

All the Hygrometrical elements are computed by the Greenwich Constant:



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
1	139.0	...	S & S S W	5.0	385.5	Chiefly scuds. High wind from 7½ A. M. to 7 P. M. D at 4½ P. M.
2	140.0	0.95	S S E & S	11.0	309.6	B to 1 A. M. Scuds to 6, O to 11 P. M. High wind from 2 to 7½ P. M. D at 2 A. M. T, L & R from 7 to 11 P. M.
3	136.5	0.38	Variable	3.0	203.3	O to 7, \i to 10 A. M., \i to 1, \i to 6, O to 11 P. M. Brisk wind from Midnight to 8 A. M. T at 8 & 9 P. M. L from 7 to 11 P. M. Slight R at midnight, 4½, 6, A. M. 5, 7 & 8 P. M.
4	138.5	C.16	E N E & Variable	2.0	149.4	O to 3; \i to 7, \i to 9 A. M. \i to 7, O to 11 P. M. L from 7 to 10 P. M. T at 9 P. M. R between 8 & 9 P. M.
5	138.0	...	Variable	...	72.3	O to 1, S to 4, \i to 11 A. M. \i to 6, S to 11 P. M. T at 5½ & 6½ P. M. L at 6½, 9 & 10 P. M.
6	131.0	...	E & E S E	1.0	51.9	B to 4, \i to 6, S to 10, O to Noon, \i to 5, \i to 11 P. M. Sheet L on N at 4 A. M. T from 10 to Noon D at 11 & Noon.
7	140.0	...	E S E, E, & S S E	1.2	53.2	B to 7 A. M., \i to 7, B to 11 P. M., T from 2½ to 4 P. M. D at 4½ P. M.
8	141.0	...	S S E & S by E	0.2	57.7	B to 6 A. M., \i to 3, \i to 5, B 11 P. M. Sheet L on N from 7½ to 10 P. M.
9	134.0	0.09	S S E & S	34.0	125.5	B to 6 A. M., \i to 5, S to 11 P. M. Strong wind from 7½ to 8½ P. M. L on N W at 10 P. M.
10	142.8	...	E & S S W	...	100.7	Slight R between 7 & 8 P. M. S to 6 A. M., \i to 4, B to 7, \i to 9 \i to 11 P. M. Sheet L from 8 to 11 P. M.
11	144.5	...	S & S S W	2.7	115.3	O to 3, S to 8 A. M., \i to 2, B to 7, \i to 11 P. M. D at 8½ P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro, cumuli-B clear, S stratoni, O overcast, T thunder, L lightning, R. rain, D, drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of May 1875.*

## Solar Radiation, Weather, &amp;c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<sup>o</sup>	Inches		lb	Miles.	
12	141.2	0.63	S & S W	14.0	175.0	O to 4, \i to 7 A. M., \i O to 11 P. M. High wind. 3½ to 8 P. M. T & L between 8 P. M., R from 7½ to 9 P. M.
13	144.5	...	S E & S S W	...	174.1	O to 1, \i to 8 A. M., \i B to 11 P. M.
14	140.0	...	S & S S W	1.2	223.9	B to 5, \i to 8 A. M., \i S to 8, \i to 11 P. M. Brisk v from 7½ A. M., to 2 P. M. S L on W at 7½ P. M.
15	141.0	...	S S W & S	3.2	267.9	B to 11 A. M., \i to 3, 11 P. M. Brisk wind from 7 10½ A. M.
16	142.0	0.04	S & S S W	7.2	79.4	B to 3, \i to 6 A. M., \i B to 9, O to 11 P. M. High w from 9½ to 11½ P. M. L from 11 P. M. T between 10 & 11 P. Light R between 9 & 10 P. \i to 3 A. M., \i to 11 P. High wind, T & L & Sligh from 8 to 10 P. M.
17	144.0	0.13	S S W & S	13.0	70.0	O to 6, \i to 11 A. M., \i 5, B to 9, O to 11 P. M. T, L Midnight, 4 A. M. & 11 P. Slight R at Midnight 8½ A. & 11 P. M.
18	140.0	0.14	S & S by W	3.8	249.9	S to 5 A. M., \i to 1, \i t 8 to 11 P. M. L from Midni to 2 A. M. T at 1, 2, A. M. 3 P. M. D at 2 A. M. & 4 P. M.
19	139.8	...	S E & S S E	2.0	132.8	\i to 5, \i to 9 A. M. \i t \i to 11 P. M. Brisk wind T, between 4 & 5 P. M.
20	145.0	0.22	S & S S E	2.0	99.8	\i to 7, B to 10 A. M., \i t S to 6, \i to 11 P. M. T at 6
21	142.5	...	S	0.8	99.0	

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nim  
\i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning  
R. rain, D. drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1875.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<sup>o</sup>	Inches.		lb	Miles.	
22	144.0	0.05	S	4.2	59.7	∩i to 9 A. M., ∩i to 4, ∩i to 11, P. M. High wind from 3 to 4 P. M. T from 2½ to 4 P. M. L at 3½ & 8 P. M. Light R at 3½ & 4½ P. M.
23	144.0	...	S S W & S	...	80.5	∩i to 8 A. M., ∩i to 4, ∩i to 6, B toll P. M. T at 3½ P. M.
24	145.0	0.13	S & S W	34.0	120.0	∩i to 8 A. M., ∩i to 3, ∩i to 5, O to 11 P. M. Strong wind between 6 & 7 P. M. T at 3½ & 4 & from 6½ to 9 P. M. L from 6½ to 11 P. M. Slight R from 6½ to 8 P. M.
25	147.0	0.37	S S W & S	6.0	162.9	S to 4 A. M., ∩i to 7, S to 9, O to 11 P. M. L from 8 to 11 P. M. High wind T & R between 10 & 11 P. M.
26	...	1.12	S & Variable	13.5	128.3	O to 2, ∩i to 10 A. M., ∩i to 7, O to 11 P. M. High wind from 8½ to 9 P. M. T & L at Midnight & from 7 to 9 P. M. R from 8½ to 10 P. M.
27	...	0.83	S & S S W	12.0	219.1	∩i to 3, O to 7 A. M., ∩i to 1 ∩i to 3, O to 7, ∩i & ∩i to 11 P. M. High wind from 3½ to 4½ A. M. T from 3½ to 6½ A. M. & at 5 P. M. L from 3½ to 5 A. M. R from 3½ to 7 A. M. & at 5 & 6 P. M.
28	134.0	...	S	...	97.7	∩i to 7 A. M., ∩i to 4, B to 11 P. M. Sheet L on W at 8 & 9 P. M.
29	146.5	...	S & S S W	0.8	133.5	B to 7 A. M., ∩i to 3, ∩i to 11 P. M. Sheet L at 8 & 9 P. M.
30	145.8	...	S S W & S	...	125.1	S to 10 A. M., ∩i to 4, ∩i to 8, B to 11 P. M. Sheet L on W at 8 P. M.
31	142.5	...	S S W & S	0.8	143.1	S to 4 A. M., ∩i to 4, ∩i to 11 P. M. Sheet L on E at 8 & 9 P. M.

∩i Cirri —i Strati, ∩i Cumuli, ∩i Cirro-strati, ∩i Cumulo-strati ∩i Nimb,  
∩i Cirro-Cumuli, B clear, S stratoni, O overcast, T thunder, L lightening  
R rain, D. drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1875.*

## MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ...	29.698
Max. height of the Barometer occurred at 7 A. M. on the 3rd ...	29.913
Min. height of the Barometer occurred at 5 P. M. on the 9th ...	29.519
Extreme range of the Barometer during the month ...	0.393
Mean of the daily Max. Pressures ...	29.771
Ditto ditto Min. ditto ...	29.616
Mean daily range of the Barometer during the month ...	0.155

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	°
Mean Dry Bulb Thermometer for the month ...	84.3
Max. Temperature occurred at 3 P. M. on the 31st ...	96.0
Min. Temperature occurred at 8 & 11 P. M. on the 2nd ...	72.5
Extreme range of the Temperature during the month ...	23.5
Mean of the daily Max. Temperature ...	92.9
Ditto ditto Min. ditto, ...	77.3
Mean daily range of the Temperature during the month ...	15.6

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Mean Wet Bulb Thermometer for the month ...	78.5
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	5.8
Computed Mean Dew-point for the month ...	74.4
Mean Dry Bulb Thermometer above computed mean Dew-point ...	9.9

	Inches.
Mean Elastic force of Vapour for the month ...	0.838

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	Troy grain.
Mean Weight of Vapour for the month ...	8.97
Additional Weight of Vapour required for complete saturation ...	3.31
Mean degree of humidity for the month, complete saturation being unity ...	0.73

	°
Mean Max. Solar radiation Thermometer for the month ...	141.2

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	Inches.
Rained 19 days,—Max. fall of rain during 24 hours ...	1.12
Total amount of rain during the month ...	5.24
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ...	4.23
Prevailing direction of the Wind ... S. & S. S. W.	

\* Height 70 feet 10 inches above ground.











*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.566	29.639	29.466	0.173	87.4	97.7	79.0	18.7
2	.525	.575	.440	.135	88.4	96.6	79.9	16.7
3	.508	.580	.439	.141	88.1	98.0	83.7	14.3
4	.470	.537	.375	.162	90.1	98.7	83.3	15.4
5	.453	.501	.410	.091	84.1	88.5	80.0	8.5
6	.504	.568	.457	.111	84.6	92.5	80.0	12.5
7	.580	.673	.511	.162	87.3	95.0	80.2	14.8
8	.679	.738	.613	.125	82.4	89.7	78.7	11.0
9	.695	.769	.618	.151	82.3	85.5	80.0	5.5
10	.613	.663	.555	.108	83.3	86.5	79.6	6.9
11	.564	.606	.512	.094	82.4	84.5	80.5	4.0
12	.589	.664	.529	.135	80.5	82.6	77.2	5.4
13	.632	.692	.579	.113	82.9	85.7	81.0	4.7
14	.595	.664	.517	.147	84.1	92.2	79.5	12.7
15	.526	.583	.461	.122	86.1	93.0	80.5	12.5
16	.541	.613	.482	.131	85.9	94.0	81.0	13.0
17	.586	.649	.524	.125	83.5	89.5	79.8	9.7
18	.563	.617	.484	.133	83.1	89.3	80.0	9.3
19	.519	.560	.454	.106	82.2	86.5	79.5	7.0
20	.515	.548	.458	.090	83.0	87.7	79.5	8.2
21	.521	.573	.475	.098	85.5	90.8	82.0	8.8
22	.497	.550	.455	.095	83.2	88.5	80.9	7.6
23	.445	.509	.366	.143	80.4	82.0	79.5	2.5
24	.469	.540	.425	.115	82.3	86.0	78.5	7.5
25	.520	.574	.468	.106	83.5	88.7	81.0	7.7
26	.512	.549	.463	.086	83.7	90.4	81.0	9.4
27	.480	.523	.409	.114	83.3	86.4	81.0	5.4
28	.404	.471	.322	.149	82.2	86.0	79.5	6.5
29	.411	.456	.353	.103	82.6	86.7	80.0	6.7
30	.430	.478	.384	.094	80.5	82.4	77.9	4.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of June 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	81.7	5.7	78.3	9.1	0.949	10.09	3.36	
2	82.6	5.8	79.1	9.3	.973	.34	.50	
3	81.8	6.3	78.0	10.1	.940	9.99	.73	
4	82.4	7.7	77.8	12.3	.934	.89	4.65	
5	81.2	2.9	79.2	4.9	.976	10.45	1.76	
6	79.6	5.6	76.1	8.5	.885	9.46	2.93	
7	81.9	5.4	78.7	8.6	.961	10.22	3.19	
8	79.9	2.5	78.1	4.3	.943	.14	1.47	
9	80.1	2.2	78.6	3.7	.958	.30	.23	
10	80.9	2.4	79.2	4.1	.976	.48	.45	
11	79.5	2.9	77.5	4.9	.925	9.94	.67	
12	78.8	1.7	77.6	2.9	.928	10.01	0.97	
13	81.0	1.9	79.7	3.2	.992	.06	1.13	
14	80.6	3.5	78.1	6.0	.943	.10	2.11	
15	81.4	4.7	78.1	8.0	.943	.06	.89	
16	82.2	3.7	79.6	6.3	.989	.56	.31	
17	80.9	2.6	79.1	4.4	.973	.45	1.55	
18	80.7	2.4	79.0	4.1	.970	.42	.44	
19	80.3	1.9	79.0	3.2	.970	.44	.10	
20	80.5	2.5	78.7	4.3	.961	.33	.49	
21	82.2	3.3	79.9	5.6	.998	.65	2.07	
22	81.2	2.0	79.8	3.4	.995	.69	1.20	
23	79.2	1.2	78.4	2.0	.952	.27	0.67	
24	79.7	2.6	77.9	4.4	.937	.08	1.50	
25	80.9	2.6	79.1	4.4	.973	.45	.55	
26	81.1	2.6	79.3	4.4	.979	.51	.56	
27	81.1	2.2	79.6	3.7	.989	.60	.33	
28	80.1	2.1	78.6	3.6	.958	.30	.24	
29	78.6	4.0	75.8	6.8	.876	9.41	2.27	
30	78.4	2.1	76.9	3.6	.908	.78	1.20	

All the Hygrometrical elements are computed by the Greenwich Constant



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.549	29.728	29.427	0.301	82.0	86.7	79.9	6.8
1	.536	.720	.412	.308	81.6	86.3	80.0	6.3
2	.524	.710	.403	.307	81.4	86.0	78.7	7.3
3	.513	.696	.393	.303	81.4	85.8	78.8	7.0
4	.510	.690	.384	.306	81.3	85.6	78.5	7.1
5	.521	.709	.382	.327	81.2	85.5	78.5	7.0
6	.538	.722	.413	.309	81.4	85.5	78.0	7.5
7	.553	.740	.435	.305	82.2	85.5	77.9	7.6
8	.567	.747	.429	.318	83.5	87.3	78.0	9.3
9	.573	.755	.437	.318	84.9	90.0	79.5	10.5
10	.572	.757	.426	.331	86.4	92.5	80.4	12.1
11	.564	.769	.409	.360	87.1	95.1	78.0	17.1
Noon.	.547	.741	.386	.358	87.5	96.8	77.2	19.6
1	.530	.691	.376	.315	87.6	97.7	77.6	20.1
2	.509	.680	.333	.347	87.1	98.7	78.5	20.2
3	.491	.685	.322	.363	87.1	98.5	79.7	18.8
4	.478	.652	.330	.322	86.7	98.3	79.5	18.8
5	.476	.659	.332	.327	86.0	96.4	79.5	16.9
6	.487	.674	.349	.325	84.9	95.0	79.3	15.7
7	.510	.679	.379	.300	83.6	93.0	79.0	14.0
8	.525	.681	.397	.284	82.9	89.8	79.0	10.8
9	.542	.705	.418	.287	82.6	88.5	79.5	9.0
10	.557	.738	.427	.311	82.4	87.5	79.5	8.0
11	.556	.734	.430	.304	82.2	87.0	80.0	7.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid-night.	79.9	2.1	78.4	3.6	0.952	10.23	1.24	
1	79.6	2.0	78.2	3.4	.946	.19	.15	
2	79.7	1.7	78.5	2.9	.955	.29	0.98	
3	79.7	1.7	78.5	2.9	.955	.29	.98	
4	79.6	1.7	78.4	2.9	.952	.25	.99	
5	79.8	1.4	78.8	2.4	.964	.40	.81	
6	80.1	1.3	79.2	2.2	.976	.52	.75	
7	80.5	1.7	79.3	2.9	.979	.53	1.01	
8	81.1	2.4	79.4	4.1	.983	.54	.46	
9	81.4	3.5	78.9	6.0	.967	.34	2.15	
10	81.8	4.6	78.6	7.8	.958	.21	.85	
11	81.9	5.2	78.8	8.3	.964	.27	3.06	
Noon.	81.9	5.6	78.5	9.0	.955	.16	.33	
1	82.0	5.6	78.6	9.0	.958	.19	.33	
2	81.7	5.4	78.5	8.6	.955	.16	.17	
3	81.7	5.4	78.5	8.6	.955	.16	.17	
4	81.7	5.0	78.7	8.0	.961	.24	2.94	
5	81.3	4.7	78.0	8.0	.940	.03	.88	
6	80.8	4.1	77.9	7.0	.937	.02	.47	
7	80.1	3.5	77.6	6.0	.928	9.95	.08	
8	80.2	2.7	78.3	4.6	.949	10.18	1.61	
9	80.1	2.5	78.3	4.3	.949	.20	.48	
10	79.9	2.5	78.1	4.3	.943	.14	.47	
11	80.1	2.1	78.6	3.6	.958	.30	.24	

All the Hygrometrical elements are computed by the Greenwich Constar



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
		Inches		lb	Miles.	
1	142.0	0.09	S S W & S S E	10.2	217.3	\\i to 10 A. M., \\i to 1, \\i to 5, O to 11 P. M. High wind from 6½ to 6¾ P. M. T & L from 6½ to 8 P. M. Slight R between 6 & 7 & at 8 P. M.
2	139.2	...	S by W & S	...	Out of order	S to 2, B to 5 A. M., \\i to 7, B to 11 P. M.
3	147.2	...	S & S S E	...		B to 3, \\i to 9 A. M., \\i to 2, S to 7, \\i to 11 P. M.
4	142.7	...	S E & S	...		\\i to 5, S to 10 A. M., \\i & \\i to 7, O to 9, S to 11 P. M.
5	128.8	0.16	Variable.	...		Chiefly O. T from 1 to 3 P. M. L at 9 P. M. Light R after intervals.
6	141.0	0.03	S S W & variable.	2.0	124.2	O to 7, \\i to Noon, \\i & \\i to 6, O to 11 P. M. Sheet L from 6½ to 10 P. M. Light R at Midnight 1 A. M. & 7 P. M.
7	145.0	...	E S E, S S W & S	1.2	109.8	S to 2, \\i to 8 A. M., \\i & \\i to 7, O to 11 P. M. Sheet L on W from 8 to 11 P. M. D at 10½ P. M.
8	127.0	0.14	S S E & S E	1.2	231.3	O to 7, \\i to 11 A. M. O to 11 P. M. Sheet L from Midnight to 2 A. M. T at 11½ A. M. 1½, 3 & 4 P. M. Light R after intervals.
9	120.0	0.05	S S E & S	1.3	150.2	O to 4, \\i to 6, \\i to 11 P. M. Light R at Midnight 4½ & 7½ A. M.
10	108.2	...	S by W & S	4.2	155.5	\\i to 7, \\i to 10 A. M. O to 5, S to 11 P. M.
11	96.0	...	S S W & S W	2.0	229.9	O to 3, \\i to 6 A. M. O to 8, S to 11 P. M. D at 6 & 7 P. M.
12	...	1.10	S S W	6.0	245.1	O. Brisk wind from 3½ to 7 & 10 to 10½ A. M. T at 8, 10 & 11 A. M. L at 8 A. M. R after intervals.
13	...	0.66	S S W & S W	1.8	204.0	O to 8, \\i to 11 P. M. R from Midnight to 1 P. M.

\\i Cirri, —i Strati, \\i Cumuli, \\i Cirro-strati, \\i Cumulo-strati, \\i Nimbi, \\i Cirro, cumuli-B clear, S strati, O overcast, T thunder, L lightning, R. rain, D, drizzle.



*Extract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1875.*

Solar Radiation, Weather, &c.,

Rainfall.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
		Prevailing direction.	Max. Pressure	Daily Velocity.	
	Inches.		lb	Miles.	
.0	0.05	S S W & S	...	192.2	S to Noon, O to 5, \i to 8, B to 11 P. M. Slight R at 12½, & 1½ P. M.
.5	0.12	S by E & S	0.4	119.9	B to 3, \i to 6, \i to 9 A. M., \i to 1, O to 5, \i to 7, B to 11 P. M. T from 2½ to 4 P. M. R at 1½ & 3 P. M.
1.0	0.43	S by W & S S W	1.0	96.6	B to 1, O to 4, \i to 10 A. M. O to 2, \i to 6, S to 11 P. M. T at 11 A. M. & 1 P. M. Sheet L between 7 & 8 P. M. R from 11 A. M. to 2 P. M.
1.0	0.98	S S W	4.0	115.5	O to 6, \i to 9, \i to Noon, O to 11 P. M. Brisk wind from 3½ to 9 P. M. R after intervals between Midnight & 5 P. M.
1.9	0.02	SS W	1.0	286.6	O to 8, \i to Noon, \i to 9, O to 11 P. M. Light R between Midnight & 1 A. M. & at 1½ P. M.
1.0	0.22	S S W & S	...	237.1	S to 4 A. M., O to 4, S to 6, \i to 8, O to 11 P. M. Slight R after intervals between 6 A. M. & 3 P. M.

ri —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati \i Nimb,  
ro-Cumuli, B clear, S straton, O overcast, T thunder, L lightning  
, D. drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of June 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
14	142.8	0.02	S S W	3.0	303.7	¶i to 6, S to 10 A. M., ¶i to 1 ¶i to 5, O to 11 P. M. T at 3½, 5 & 6 P. M. Light R at 8 A. M. 6, 7 & 8½ P. M.
15	142.0	...	S W & S	0.8	277.9	O to 6 A. M., ¶i to 2, S to 6, ¶i to 11 P. M.
16	149.0	0.07	S	1.8	174.3	¶i to 2, ¶i to 9 A. M., ¶i to 3, O to 11 P. M. T from 3 to 7 P. M. L from 4½ to 8 P. M. Light R from 6½ to 11 P. M.
17	145.0	1.13	S E, S & E S E	2.0	143.3	¶i to 4, O to 7 A. M., ¶i to 11 P. M. T at 11 A. M. 2 & 5 P. M. L at 2 P. M. R after intervals between 11 A. M. to 8 P. M.
18	140.2	1.49	E & E by S	3.0	142.2	¶i to 1, B to 5 A. M., ¶i & ¶i to 4, O to 6, ¶i to 11 P. M. T at 1½ P. M. R at 1½, 2½, 4½ & 9½ P. M.
19	120.2	1.29	S E & S	2.4	162.5	¶i to 8, ¶i to Noon, O to 5, S to 8, ¶i to 11 P. M. T between 12 & 1 P. M. R at 2½, 3½, from 10 A. M. to 3 at 4½ & 6½ P. M.
20	119.0	0.15	S & S by E	0.2	159.3	¶i to 1 A. M. O to 2, ¶i to 7, ¶i to 11 P. M. Slight R from 5 to 8 A. M. & at 6½ P. M.
21	138.0	...	S & S S W	...	200.8	O to 5, ¶i to 9 A. M., ¶i to 1, S to 6, clouds of different kinds to 11 P. M. Sheet L on N at 9 P. M. D at 12½ P. M.
22	126.5	1.01	S & S S W	...	149.5	¶i to 7, ¶i to Noon, O to 6, ¶i & ¶i to 11 P. M. T from 11 A. M. to 1 P. M. R between 12 & 1 & at 6 P. M.
23	...	2.20	S S W & S by W	...	82.5	O to 2, ¶i to 5 A. M. O to 11 P. M. R at 8 & from 10 A. M. to 5 P. M.
24	109.7	0.42	S S W & S by W	0.3	189.8	O to 5, S to 7, ¶i & ¶i to 11 P. M. R at Midnight from 4 to 6½ at 8, 11 A. M. & 10½ P. M.

¶i Cirri,—i Strati, ¶i Cumuli, ¶i Cirro-strati, ¶i Cumulo-strati, ¶i Nimbi,  
¶i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning  
R. rain, D. drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1875.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<sup>o</sup>	Inches.		<sup>h</sup>	Miles.	
25	128.0	0.05	S S W & S	...	192.2	S to Noon, O to 5, \i to 8, B to 11 P. M. Slight R at 12½, & 1½ P. M.
26	148.5	0.12	S by E & S	0.4	119.9	B to 3, \i to 6, \i to 9 A. M., \i to 1, O to 5, \i to 7, B to 11 P. M. T from 2½ to 4 P. M. R at 1½ & 3 P. M.
27	130.0	0.43	S by W & S S W	1.0	96.6	B to 1, O to 4, \i to 10 A. M. O to 2, \i to 6, S to 11 P. M. T at 11 A. M. & 1 P. M. Sheet L between 7 & 8 P. M. R from 11 A. M. to 2 P. M.
28	139.0	0.98	S S W	4.0	115.5	O to 6, \i to 9, \i to Noon, O to 11 P. M. Brisk wind from 3½ to 9 P. M. R after intervals between Midnight & 5 P. M.
29	132.9	0.02	SS W	1.0	286.6	O to 8, \i to Noon, \i to 9, O to 11 P. M. Light R between Midnight & 1 A. M. & at 1½ P. M.
30	119.0	0.22	S S W & S	...	237.1	S to 4 A. M., O to 4, S to 6, \i to 8, O to 11 P. M. Slight R after intervals between 6 A. M. & 3 P. M.

\i Cirri —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati \i Nimb, \i Cirro-Cumuli, B clear, S strati, O overcast, T thunder, L lightning R rain, D. drizzle.



# Meteorological Observations.

## *Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of June 1875.*

### MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.530
Max. height of the Barometer occurred at 11 A. M. on the 9th ...	29.769
Min. height of the Barometer occurred at 3 P. M. on the 28th ...	29.322
Extreme range of the Barometer during the month ... ..	0.447
Mean of the daily Max. Pressures ... ..	29.589
Ditto ditto Min. ditto ... ..	29.467
Mean daily range of the Barometer during the month ... ..	0.122

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	°
Mean Dry Bulb Thermometer for the month ... ..	84.0
Max. Temperature occurred at 2 P. M. on the 4th ... ..	98.7
Min. Temperature occurred at Noon on the 12th ... ..	77.2
Extreme range of the Temperature during the month ... ..	21.5
Mean of the daily Max. Temperature ... ..	89.4
Ditto ditto Min. ditto, ... ..	80.1
Mean daily range of the Temperature during the month ... ..	9.3

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Mean Wet Bulb Thermometer for the month ... ..	80.7
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	3.3
Computed Mean Dew-point for the month ... ..	78.4
Mean Dry Bulb Thermometer above computed mean Dew-point ... ..	5.6

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.952

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	Troy grain.
Mean Weight of Vapour for the month ... ..	10.19
Additional Weight of Vapour required for complete saturation ...	1.98
Mean degree of humidity for the month, complete saturation being unity	0.84

	°
Mean Max. Solar radiation Thermometer for the month ... ..	132.1

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	Inches.
Rained 25 days,—Max. fall of rain during 24 hours ... ..	2.20
Total amount of rain during the month ... ..	11.83
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	10.73
Prevailing direction of the Wind ... .. S. S. W. & S.	

\* Height 70 feet 10 inches above ground.











*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.455	29.498	29.399	0.099	81.8	85.7	79.5	6.2
2	.461	.507	.406	.101	83.7	91.0	78.5	12.5
3	.486	.526	.434	.092	84.1	90.0	80.5	9.5
4	.502	.555	.452	.103	81.8	84.0	80.5	3.5
5	.545	.603	.491	.112	80.3	85.2	78.0	7.2
6	.614	.691	.560	.131	81.3	87.0	78.0	9.0
7	.694	.744	.633	.111	82.5	88.7	78.8	9.9
8	.671	.732	.582	.150	84.2	91.0	79.7	11.3
9	.628	.670	.561	.109	85.2	91.6	80.6	11.0
10	.642	.694	.580	.114	84.8	90.5	80.3	10.2
11	.624	.685	.561	.124	83.2	86.5	80.0	6.5
12	.494	.589	.416	.173	81.3	84.2	80.0	4.2
13	.422	.468	.367	.101	81.3	84.5	79.4	5.1
14	.316	.395	.210	.185	79.2	80.5	77.4	3.1
15	.398	.520	.262	.258	81.4	85.5	77.5	8.0
16	.506	.560	.447	.113	84.2	89.0	79.5	9.5
17	.498	.550	.426	.124	85.6	91.0	80.5	10.5
18	.471	.530	.407	.123	86.2	90.0	83.5	6.5
19	.425	.475	.370	.105	86.7	92.6	82.0	10.6
20	.413	.460	.335	.125	85.1	90.4	81.8	8.6
21	.439	.502	.383	.119	83.6	87.4	80.5	6.9
22	.463	.502	.389	.113	83.7	89.2	80.5	8.7
23	.413	.456	.354	.102	84.1	89.8	81.0	8.8
24	.396	.431	.337	.094	85.7	91.5	81.8	9.7
25	.431	.496	.387	.109	84.5	90.0	81.2	8.8
26	.504	.577	.454	.123	83.8	89.3	81.0	8.3
27	.586	.644	.536	.108	80.3	81.5	78.0	3.5
28	.596	.648	.534	.114	83.3	86.9	80.6	6.3
29	.562	.615	.520	.095	83.1	86.5	81.0	5.5
30	.552	.603	.487	.116	82.3	87.2	80.0	7.2
31	.530	.593	.480	.113	80.6	82.3	78.6	3.7

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of July 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	79.0	2.8	77.0	4.8	0.910	9.79	1.61	
2	80.6	3.1	78.4	5.3	.952	10.21	.86	
3	81.3	2.8	79.3	4.8	.979	.48	.73	
4	80.2	1.6	79.1	2.7	.973	.47	0.93	
5	79.4	0.9	78.8	1.5	.964	.40	.51	
6	79.3	2.0	77.9	3.4	.937	.10	1.14	
7	79.9	2.6	78.1	4.4	.943	.14	.50	
8	80.4	3.8	77.7	6.5	.931	9.96	2.28	
9	80.6	4.6	77.4	7.8	.922	.85	.76	
10	80.5	4.3	77.5	7.3	.925	.90	.56	
11	80.5	2.7	78.6	4.6	.958	10.28	1.61	
12	79.8	1.5	78.7	2.6	.961	.35	0.89	
13	79.3	2.0	77.9	3.4	.937	.10	1.14	
14	77.7	1.5	76.6	2.6	.899	9.71	0.85	
15	78.9	2.5	77.1	4.3	.913	.84	1.43	
16	80.6	3.6	78.1	6.1	.943	10.10	2.14	
17	81.1	4.5	77.9	7.7	.937	.00	.76	
18	83.1	3.1	80.9	5.3	1.030	.99	.00	
19	82.9	3.8	80.6	6.1	.021	.88	.30	
20	81.2	3.9	78.5	6.6	0.955	.21	.36	
21	80.3	3.3	78.0	5.6	.940	.07	1.96	
22	80.9	2.8	78.9	4.8	.967	.37	.70	
23	81.1	3.0	79.0	5.1	.970	.40	.81	
24	82.1	3.6	79.6	6.1	.989	.56	2.24	
25	81.1	3.4	78.7	5.8	.961	.29	.06	
26	80.7	3.1	78.5	5.3	.955	.25	1.85	
27	79.3	1.0	78.6	1.7	.958	.34	0.57	
28	80.8	2.5	79.0	4.3	.970	.42	1.51	
29	79.4	3.7	76.8	6.3	.905	9.71	2.15	
30	78.9	3.4	76.5	5.8	.896	.63	1.95	
31	78.9	1.7	77.7	2.9	.931	10.04	0.97	

All the Hygrometrical elements are computed by the Greenwich Constant



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Falt.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid- night.	29.524	29.718	29.268	0.450	81.6	84.5	78.5	6.0
1	.514	.709	.274	.435	81.2	84.2	78.0	6.2
2	.502	.696	.273	.423	81.0	84.0	77.7	6.3
3	.491	.677	.266	.411	80.8	84.0	77.5	6.5
4	.485	.670	.262	.408	80.7	84.0	78.0	6.0
5	.493	.683	.274	.409	80.4	84.0	77.8	6.2
6	.506	.705	.300	.405	80.4	83.6	78.0	5.6
7	.522	.725	.331	.394	81.0	84.5	77.4	7.1
8	.536	.740	.338	.402	82.0	86.2	77.5	8.7
9	.546	.744	.353	.391	83.5	88.5	78.8	9.7
10	.547	.742	.355	.387	84.6	89.5	79.4	10.1
11	.540	.729	.358	.371	85.6	89.3	79.0	10.3
Noon.	.530	.717	.330	.387	86.1	90.5	80.0	10.5
1	.512	.713	.287	.426	86.3	91.5	79.4	12.1
2	.490	.693	.276	.417	86.2	91.7	78.0	13.7
3	.472	.680	.264	.416	86.4	92.6	78.5	14.1
4	.458	.641	.260	.381	86.1	91.8	78.7	13.1
5	.455	.633	.241	.392	85.5	91.4	79.0	12.4
6	.466	.636	.210	.426	84.4	91.4	79.3	12.1
7	.485	.653	.232	.421	83.3	86.7	78.6	8.1
8	.506	.673	.299	.374	82.8	86.7	79.0	7.7
9	.526	.695	.319	.376	82.5	86.2	78.5	7.7
10	.540	.732	.317	.415	82.2	85.5	78.5	7.0
11	.538	.726	.292	.434	81.8	84.7	78.5	6.2

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	79.9	1.7	78.7	2.9	0.961	10.35	0.99	0.91
1	79.7	1.5	78.6	2.6	.958	.32	.89	.92
2	79.6	1.4	78.6	2.4	.958	.34	.80	.93
3	79.5	1.3	78.6	2.2	.958	.34	.73	.93
4	79.4	1.3	78.5	2.2	.955	.31	.73	.93
5	79.2	1.2	78.4	2.0	.952	.27	.67	.94
6	79.1	1.3	78.2	2.2	.946	.21	.73	.93
7	79.5	1.5	78.4	2.6	.952	.25	.89	.92
8	80.1	1.9	78.8	3.2	.964	.38	1.09	.91
9	80.6	2.9	78.6	4.9	.958	.28	.72	.86
10	80.9	3.7	78.3	6.3	.949	.16	2.23	.82
11	81.3	4.3	78.3	7.3	.949	.14	.62	.80
Noon.	81.3	4.8	77.9	8.2	.937	.00	.95	.77
1	81.4	4.9	78.0	8.3	.940	.03	.99	.77
2	81.4	4.8	78.0	8.2	.940	.03	.96	.77
3	81.2	5.2	77.6	8.8	.928	9.89	3.17	.76
4	81.1	5.0	77.6	8.5	.928	.89	.06	.76
5	81.0	4.5	77.8	7.7	.934	.97	2.75	.78
6	80.7	3.7	78.1	6.3	.943	10.10	.21	.82
7	80.3	3.0	78.2	5.1	.946	.15	1.78	.85
8	80.2	2.6	78.4	4.4	.952	.23	.52	.87
9	80.2	2.3	78.6	3.9	.958	.30	.34	.89
10	80.1	2.1	78.6	3.6	.958	.30	.24	.89
11	79.9	1.9	78.6	3.2	.958	.32	.08	.91

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches		lb	Miles.	
1	130.0	0.08	S S W	2.0	166.9	Chiefly O. Brisk wind from 10 A. M. to 1 P. M. Slight R after intervals from 5 A. M. to 2 P. M.
2	137.5	0.19	S E & E S E	...	165.6	O to 5, \i to 8 A. M., \i to 4, clouds of different kinds to 11 P. M. T & L at 3 & 4 A. M. Slight R at Midnight, 1, 4½ 9½ A. M. 4½ & 5 P. M.
3	144.0	0.19	E & S E	0.2	170.1	\i & \i to 1 O to 8 A. M., \i to 4, S to 11 P. M. R after intervals from 1 to 8 P. M.
4	...	0.48	S	0.8	168.3	Chiefly O. R after intervals.
5	...	1.49	S & S E	1.0	170.4	Chiefly O. T & L at Noon & 1½ P. M. R after intervals.
6	140.0	0.71	S E & S	...	133.7	O to 9 A. M., \i to 7, B to 11 P. M. Sheet L on N W at 11 P. M. R after intervals.
7	138.0	0.11	SSE, S & S by W	1.0	112.4	B to 1, \i to 8 A. M., \i to 6, B to 11 P. M. Sheet L on N W at Midnight & 1 A. M. T & R between 12 & 1 P. M.
8	147.0	...	S by W & S S W	...	79.1	B to 3, \i to 8 A. M., \i to 6, \i to 11 P. M.
9	143.7	...	S S W & S	...	131.8	S to 2, \i to 5, Scuds to 9 A. M., \i to 5 \i to 8, S to 11 P. M.
10	147.5	...	S & S S E	0.4	160.0	B to 4, \i to 7 A. M., \i to 8, \i to 11 P. M. Sheet L on S at 10 P. M.
11	134.0	0.49	S & S S W	0.8	169.0	O to 7, \i to 11 A. M. O to 7 S to 11 P. M. R from 1 to 7 A. M. at Noon & 11 P. M.
12	...	3.33	Variable.	1.5	203.6	O. T & L after intervals. R nearly the whole day.
13	127.0	0.56	N by W & N N E	2.3	169.0	O to 4, \i to 6, O to 9, \i to 11 A. M. O to 3, \i to 11 P. M., Brisk wind from 9 A. M. to 11 P. M. T at 1 P. M. L at Midnight 1 A. M. & 8 P. M. R at 9, 11 A. M. & 1 P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,  
\i Cirro, cumuli-B clear, S straton, O overcast, T thunder, L lightning,  
E. rain, D, drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of July 1875.*

## Solar Radiation, Weather, &amp;c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
14	...	1.09	N,NNE&ENE	11.2	406.9	O. High wind from midnight to 11 P. M. R nearly the whole day.
15	...	1.85	S E, & S S E	6.0	539.8	O to 10 A. M. S to 4, \i to 11 P. M. High wind from midnight to 3½ P. M. R from midnight to 9 A. M. & at 4 P. M.
16	144.0	0.06	S E, S by W & S	...	243.7	Scuds to 2, O to 4 A. M., \i to 6, \i to 11 P. M. Light R at 3 & 4 A. M.
17	144.0	...	S, WSW & S by W	...	143.9	Scuds to 3, \i to 7, \i to 11 A. M., \i to 6, \i to 11 P. M. D at 5½ & 6½ A. M.
18	...	0.12	S S W & variable.	...	111.1	\i to 1, O to 11 P. M. Slight R at 10½ A. M. 12, 5, 6, 7 & 8 P. M.
19	138.9	...	E N E & E by S	0.8	123.5	\i to 6, O to 8 A. M. \i to 7. \i to 11 P. M. T between 4 & 5 A. M. L at 4, 5 A. M. 7½, 10 & 11 P. M. D at 5½ A. M.
20	139.7	0.06	E & E S E	3.4	222.6	\i to 5, \i to 7 A. M., \i to 6, \i to 9, S to 11 P. M. T at 2½ P. M. Sheet L at midnight 8 & 10 P. M. Light R at 1½ & 4½ P. M.
21	138.0	0.08	S E & S S E	0.8	273.7	O to 5, \i to 9 A. M., \i to 2, \i to 7 \i to 11 P. M. Light R at 3, 11 A. M. 2, 6½ & 10 P. M.
22	145.0	0.35	S S E & S	...	196.2	Chiefly \i R at 12, 2, 4 & 5 P. M.
23	141.8	0.35	S	...	112.2	Scuds to 1 \i to 1 A. M., \i to 2, \i to 6, B to 11 P. M. R between midnight & 1 A. M. at 2 & 3 P. M.
24	143.8	0.28	E S E	...	97.7	\i to 1, \i to 3, S to 7 A. M., \i to 7, \i to 11 P. M. R at 3½ A. M., 2½, 5½ & 7 P. M.
25	141.4	0.17	S E	...	232.9	\i to 2, O to 6 A. M., \i to 7, \i to 11 P. M. Sheet L on N W from 7½ to 9 P. M. R at 10½, 11½ A. M. 2½, 3½ & 10½ P. M.

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S stratonii, O overcast, T thunder, L lightning R. rain, D. drizzle.

\* Fell since 4 P. M. of the 14th



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1875.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches.		Bar.	Miles.	
26	141.8	0.26	S E & S	0.5	192.2	S to 9 A. M., Ci to 11 P. M. Slight R after intervals.
27	...	1.11	S & S by E	...	186.1	Si to 1, A. M. O to 7, B to 11 P. M. R from 1 to 4½, & 8 A. M. to 2 P. M.
28	125.0	...	S S W	0.8	147.2	Si to 2, S to 7, O to 11 P. M. Ci to 5, Scuds to 11 P. M. Brisk wind from 4 to 8 P. M.
29	125.5	...	S S W	1.9	311.3	O to 11 A. M., Ci to 6, O to 11 P. M. Brisk wind from 4 A. M. to 3½ P. M. Sheet L on N W at 9 P. M. D at 10 A. M. & 11 P. M.
30	136.6	0.04	S W & S S W	2.0	266.1	O to 9 A. M. S to 2, O to 5, S to 11 P. M. Brisk wind between 2 & 3 P. M. Light R at 3, 4 & 11 P. M.
31	...	0.45	S W & S S W	4.5	215.0	O. Slight R after intervals.

Si Cirri — i Strati, Ci Cumuli, Ci Cirro-strati, ~i Cumulo-strati ~i Nimb, ~i Cirro-Cumuli, B clear, S straton, O overcast, T thunder, L lightning R rain, D. drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1875.*

## MONTHLY RESULTS.

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	Inches
Mean height of the Barometer for the month ... ..	29.56
Max. height of the Barometer occurred at 9 A. M. on the 7th	29.74
Min. height of the Barometer occurred at 6 P. M. on the 14th	29.21
Extreme range of the Barometer during the month	0.53
Mean of the daily Max. Pressures ... ..	29.56
Ditto ditto Min. ditto ... ..	29.44
Mean daily range of the Barometer during the month	0.12

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	°
Mean Dry Bulb Thermometer for the month ... ..	83.
Max. Temperature occurred at 3 P. M. on the 19th	92.
Min. Temperature occurred at 7 A. M. on the 14th	77.
Extreme range of the Temperature during the month	15.
Mean of the daily Max. Temperature ... ..	87.
Ditto ditto Min. ditto, ... ..	80.
Mean daily range of the Temperature during the month	7.

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Mean Wet Bulb Thermometer for the month ... ..	80.
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	2.
Computed Mean Dew-point for the month ... ..	78.
Mean Dry Bulb Thermometer above computed mean Dew-point	4.

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	Inches
Mean Elastic force of Vapour for the month ... ..	0.94

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	Troy grain
Mean Weight of Vapour for the month ... ..	10.14
Additional Weight of Vapour required for complete saturation	1.7
Mean degree of humidity for the month, complete saturation being unity	0.86

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	°
Mean Max. Solar radiation Thermometer for the month ... ..	138.4

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	Inches
Rained 27 days,—Max. fall of rain during 24 hours	3.35
Total amount of rain during the month	13.90
Total amount of rain indicated by the Gauge* attached to the anemometer during the month	12.37
Prevailing direction of the Wind	S. & S. S. W.

\* Height 70 feet 10 inches above ground.







*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	78.7	1.7	77.5	2.9	0.925	9.98	0.96	0.91
2	79.6	2.2	78.1	3.7	.943	10.14	1.26	.89
3	78.6	2.0	77.2	3.4	.916	9.89	.12	.90
4	79.2	3.0	77.1	5.1	.913	.82	.72	.85
5	80.1	2.0	78.7	3.4	.961	10.35	.16	.90
6	79.3	2.2	77.8	3.7	.934	.05	.26	.89
7	79.0	2.7	77.1	4.6	.913	9.82	.55	.86
8	78.9	3.2	76.7	5.4	.902	.70	.81	.84
9	79.0	2.5	77.2	4.3	.916	.87	.44	.87
10	79.6	2.7	77.7	4.6	.931	10.00	.58	.86
11	80.5	2.6	78.7	4.4	.961	.33	.53	.87
12	80.4	3.9	77.7	6.6	.931	9.96	2.32	.81
13	80.8	4.1	77.9	7.0	.937	10.02	.47	.80
14	81.2	2.4	79.5	4.1	.986	.57	1.46	.88
15	80.5	2.6	78.7	4.4	.961	.33	.53	.87
16	80.3	3.4	77.9	5.8	.937	.04	2.03	.83
17	81.2	3.1	79.0	5.3	.970	.40	1.88	.85
18	81.2	2.0	79.8	3.4	.995	.69	.20	.90
19	81.1	1.9	79.8	3.2	.995	.69	.13	.91
20	81.5	2.1	80.0	3.6	1.001	.72	.31	.89
21	81.1	2.5	79.3	4.3	0.979	.51	.52	.87
22	80.9	1.9	79.6	3.2	.989	.63	.12	.91
23	80.5	1.8	79.2	3.1	.976	.50	.08	.91
24	80.6	1.8	79.3	3.1	.979	.53	.08	.91
25	79.2	1.8	77.9	3.1	.937	.10	.04	.91
26	78.6	2.4	76.9	4.1	.908	9.78	.36	.88
27	79.9	2.7	78.0	4.6	.940	10.09	.59	.86
28	80.8	2.6	79.0	4.4	.970	.42	.54	.87
29	80.7	3.5	78.2	6.0	.946	.13	2.11	.83
30	81.1	3.4	78.7	5.8	.961	.29	.06	.83
31	81.2	3.2	79.0	5.4	.970	.40	1.91	.85

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Falt.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.603	29.657	29.544	0.113	80.4	83.0	77.4	5.6
2	.627	.676	.569	.107	81.8	86.9	77.0	9.9
3	.616	.660	.553	.107	80.6	84.5	77.8	6.7
4	.589	.641	.518	.123	82.2	87.3	77.4	9.9
5	.568	.624	.522	.102	82.1	85.3	80.0	5.3
6	.604	.677	.546	.131	81.5	84.5	79.0	5.5
7	.648	.703	.599	.104	81.7	87.8	79.0	8.8
8	.609	.664	.544	.120	82.1	87.0	78.3	8.7
9	.621	.684	.569	.115	81.5	86.4	78.5	7.9
10	.678	.742	.615	.127	82.3	87.4	79.0	8.4
11	.641	.696	.539	.157	83.1	88.1	80.0	8.1
12	.607	.666	.543	.123	84.3	91.4	79.8	11.6
13	.559	.618	.458	.160	84.9	90.7	80.5	10.2
14	.528	.576	.463	.113	83.6	87.9	80.0	7.9
15	.526	.576	.466	.110	83.1	88.7	80.0	8.7
16	.554	.601	.494	.107	83.7	88.5	79.5	9.0
17	.550	.603	.479	.124	84.3	89.8	81.0	8.8
18	.537	.591	.463	.128	83.2	86.0	81.5	4.5
19	.576	.636	.523	.113	83.0	88.0	81.0	7.0
20	.622	.671	.568	.103	83.6	90.2	80.5	9.7
21	.626	.695	.553	.142	83.6	89.5	80.2	9.3
22	.601	.643	.549	.094	82.8	85.5	80.8	4.7
23	.582	.646	.525	.121	82.3	86.0	79.0	7.0
24	.604	.687	.544	.143	82.4	85.5	79.2	6.3
25	.679	.723	.630	.093	81.0	87.0	79.0	8.0
26	.676	.737	.608	.129	81.0	87.4	76.9	10.5
27	.669	.728	.597	.131	82.6	87.0	79.0	8.0
28	.676	.721	.608	.113	83.4	88.2	80.5	7.7
29	.712	.770	.641	.129	84.2	90.5	80.7	9.8
30	.743	.804	.675	.129	84.5	90.5	81.4	9.1
31	.723	.788	.651	.137	84.4	90.5	81.2	9.3

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of The Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	79.8	1.3	78.9	2.2	0.967	10.43	0.74	0.93
1	79.6	1.2	78.8	2.0	.964	.40	.67	.94
2	79.4	1.2	78.6	2.0	.958	.34	.67	.94
3	79.2	1.2	78.4	2.0	.952	.27	.67	.94
4	79.1	1.1	78.3	1.9	.949	.24	.64	.94
5	79.0	1.0	78.3	1.7	.949	.24	.57	.95
6	79.0	1.0	78.3	1.7	.949	.24	.57	.95
7	79.4	1.2	78.6	2.0	.958	.34	.67	.94
8	80.0	1.9	78.7	3.2	.961	.35	1.09	.91
9	80.6	2.8	78.6	4.8	.958	.28	.68	.86
10	81.0	3.8	78.3	6.5	.949	.14	2.32	.81
11	81.3	4.5	78.1	7.7	.943	.06	.77	.78
Noon.	81.3	4.9	77.9	8.3	.937	.00	.99	.77
1	81.2	4.8	77.8	8.2	.934	9.97	.94	.77
2	81.3	4.8	77.9	8.2	.937	10.00	.95	.77
3	81.3	4.3	78.3	7.3	.949	.14	.62	.80
4	81.0	4.1	78.1	7.0	.943	.08	.49	.80
5	80.8	3.6	78.8	6.1	.949	.16	.15	.83
6	80.1	3.0	78.0	5.1	.940	.09	1.77	.85
7	80.0	2.6	78.2	4.4	.946	.17	.51	.87
8	80.2	2.1	78.7	3.6	.961	.33	.25	.89
9	80.0	1.9	78.7	3.2	.961	.35	.09	.91
10	79.8	1.8	78.5	3.1	.955	.29	.05	.91
11	79.8	1.6	78.7	2.7	.961	.35	0.92	.92

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taken at the Surveyor General's Office, Calcutta,  
in the month of August 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Falt.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.603	29.657	29.544	0.113	80.4	83.0	77.4	5.6
2	.627	.676	.569	.107	81.8	86.9	77.0	9.9
3	.616	.660	.553	.107	80.6	84.5	77.8	6.7
4	.589	.641	.518	.123	82.2	87.3	77.4	9.9
5	.568	.624	.522	.102	82.1	85.3	80.0	5.3
6	.604	.677	.546	.131	81.5	84.5	79.0	5.5
7	.648	.703	.599	.104	81.7	87.8	79.0	8.8
8	.609	.664	.544	.120	82.1	87.0	78.3	8.7
9	.621	.684	.569	.115	81.5	86.4	78.5	7.9
10	.678	.742	.615	.127	82.3	87.4	79.0	8.4
11	.641	.696	.539	.157	83.1	88.1	80.0	8.1
12	.607	.666	.543	.123	84.3	91.4	79.8	11.6
13	.559	.618	.458	.160	84.9	90.7	80.5	10.2
14	.528	.576	.463	.113	83.6	87.9	80.0	7.9
15	.526	.576	.466	.110	83.1	88.7	80.0	8.7
16	.554	.601	.494	.107	83.7	88.5	79.5	9.0
17	.550	.603	.479	.124	84.3	89.8	81.0	8.8
18	.537	.591	.463	.128	83.2	86.0	81.5	4.5
19	.576	.636	.523	.113	83.0	88.0	81.0	7.0
20	.622	.671	.568	.103	83.6	90.2	80.5	9.7
21	.626	.695	.553	.142	83.6	89.5	80.2	9.3
22	.601	.643	.549	.094	82.8	85.5	80.8	4.7
23	.582	.6.6	.525	.121	82.3	86.0	79.0	7.0
24	.604	.687	.544	.143	82.4	85.5	79.2	6.3
25	.679	.723	.630	.093	81.0	87.0	79.0	8.0
26	.676	.737	.608	.129	81.0	87.4	76.9	10.5
27	.669	.728	.597	.131	82.6	87.0	79.0	8.0
28	.676	.721	.608	.113	83.4	88.2	80.5	7.7
29	.712	.770	.641	.129	84.2	90.5	80.7	9.8
30	.743	.804	.675	.129	84.5	90.5	81.4	9.1
31	.723	.788	.651	.137	84.4	90.5	81.2	9.3

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of August 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	<sup>o</sup>	Inches		lb	Miles.	
14	120.0	1.02	S by W & variable	1.3	84.5	☾ i to 1, S to 8 A. M., ☾ i to 3, O to 6, S to 11 P. M. T L & R between 12 & 1 P. M.
15	142.5	0.70	E by S & S	1.8	111.8	☾ i & ☾ i to 7 A. M., ☾ i to 3 O to 6, Scuds to 11 P. M. T & L at 4½ P. M. R at 3½, 4, 5, 9½ & 11 P. M.
16	150.2	0.36	...	...	175.4	☾ i & ☾ i. R after intervals from midnight to 6½ A. M.
17	148.5	0.24	S S E	...	132.3	☾ i to 6 A. M., ☾ i to 7, ☾ i & ☾ i to 11 P. M. Slight R at 4, 6½ & 7½ P. M.
18	...	0.11	S & S by E	...	99.0	☾ i to 8 A. M. O to 1, ☾ i to 3, ☾ i to 9, ☾ i to 11 P. M. T at 9½ & 10 A. M. Sheet L at 8½ & 10½ P. M. Slight R after intervals from midnight to Noon & at 11½ P. M.
19	128.0	0.79	S E	...	98.3	☾ i to 5, ☾ i to 9, ☾ i to 11 A. M. O to 11 P. M. T at 12½, 1 & 2 P. M. R from 10½ A. M. to 12 & at 8 P. M.
20	141.5	0.56	E S E & S by E	...	85.6	Chiefly ☾ i T between 1 & 2 P. M. L at 1½ & 9 P. M. R after intervals from 10½ to 4½ P. M.
21	148.0	0.99	S	1.0	82.5	☾ i to 1, O to 3, ☾ i to 6 A. M. ☾ i to 2, O to 4, ☾ i to 7, B to 11 P. M. R at 2, 3, 9½ A. M. & 2½ P. M.
22	111.0	0.14	S & S by E	0.6	110.7	☾ i 2 to A. M., ☾ i to 5, ☾ i to 11 P. M. R at 11 A. M., 12 & 4½ P. M.
23	...	0.30	S	...	136.5	O to 11 A. M., ☾ i to 6, S to 11 P. M. Slight R from 3 to Noon.
24	...	0.57	S S W & W S W	1.2	173.3	O. T at 4½ & 5½ P. M. R at 8 A. M. & from 5½ to 10 P. M.
25	120.0	0.66	S & variable.	...	82.4	O to 9 A. M. S to 12, ☾ i to 2, O to 11 P. M. T at 3½ P. M. R from 3 to 9 P. M.
26	141.8	0.56	S E & E S E	...	78.7	O to 7 A. M. ☾ i to 7, S to 11 P. M. T at 1 A. M. R from Midnight to 4 A. M.

☾ i Cirri,—i Strati, ☾ i Cumuli, ☾ i Cirro-strati, ☾ i Cumulo-strati, ☾ i Nimbi, ☾ i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning R. rain, D. drizzle.



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in the month of August 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid- night.	29.637	29.760	29.537	0.223	81.1	83.5	78.0	5.5
1	.626	.744	.531	.213	80.8	83.0	76.9	6.1
2	.614	.733	.522	.211	80.6	82.8	76.9	5.9
3	.603	.717	.514	.203	80.4	82.5	77.0	5.5
4	.596	.728	.506	.222	80.2	82.4	77.5	4.9
5	.605	.744	.513	.231	80.0	82.2	77.4	4.8
6	.619	.752	.531	.221	80.0	82.0	77.4	4.6
7	.633	.766	.541	.225	80.6	82.9	77.4	5.5
8	.650	.777	.561	.216	81.9	84.0	77.7	6.3
9	.662	.791	.565	.226	83.4	86.4	78.5	7.9
10	.667	.801	.563	.238	84.8	88.0	79.5	8.5
11	.656	.804	.546	.258	85.8	89.5	80.0	9.5
Noon.	.639	.781	.540	.241	86.2	89.5	80.0	9.5
1	.618	.742	.519	.223	86.0	90.5	80.0	10.5
2	.593	.718	.486	.232	86.1	90.5	82.3	8.2
3	.571	.691	.466	.225	85.6	91.4	79.0	12.4
4	.559	.681	.458	.223	85.1	90.5	79.5	11.0
5	.560	.675	.463	.212	84.4	89.0	79.5	9.5
6	.573	.682	.476	.206	83.1	87.6	77.0	10.6
7	.592	.699	.494	.205	82.6	86.0	78.2	7.8
8	.617	.738	.510	.228	82.3	84.5	79.0	5.5
9	.639	.753	.532	.221	81.9	83.5	78.5	5.0
10	.652	.786	.555	.231	81.6	83.5	78.0	5.5
11	.650	.776	.550	.226	81.4	83.7	77.8	5.9

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1875.*

MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ...	29.618
Max. height of the Barometer occurred at 11 A. M. on the 30th ...	29.804
Min. height of the Barometer occurred at 4 P. M. on the 13th ...	29.458
Extreme range of the Barometer during the month ...	0.346
Mean of the daily Max. Pressures ...	29.674
Ditto ditto Min. ditto ...	29.553
Mean daily range of the Barometer during the month ...	0.121

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	°
Mean Dry Bulb Thermometer for the month ...	82.7
Max. Temperature occurred at 3 P. M. on the 12th ...	91.4
Min. Temperature occurred at 1 & 2 A. M. on the 26th ...	76.9
Extreme range of the Temperature during the month ...	14.5
Mean of the daily Max. Temperature ...	87.6
Ditto ditto Min. ditto, ...	79.5
Mean daily range of the Temperature during the month ...	8.1

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Mean Wet Bulb Thermometer for the month ...	80.2
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	2.5
Computed Mean Dew-point for the month ...	78.4
Mean Dry Bulb Thermometer above computed mean Dew-point ...	4.3

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	Inches.
Mean Elastic force of Vapour for the month ...	0.952

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	Troy grain.
Mean Weight of Vapour for the month ...	10.23
Additional Weight of Vapour required for complete saturation ...	1.49
Mean degree of humidity for the month, complete saturation being unity	0.87

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	°
Mean Max. Solar radiation Thermometer for the month ...	136.4

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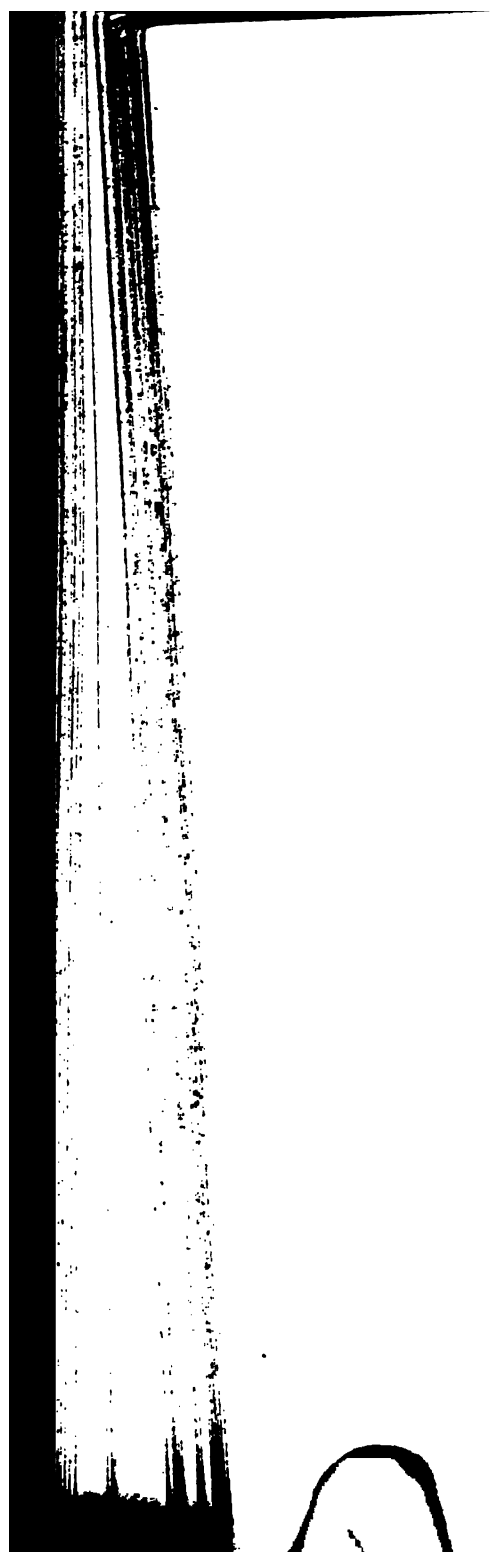
	Inches.
Rained 27 days,—Max. fall of rain during 24 hours ...	1.21
Total amount of rain during the month ...	12.64
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ...	11.46
Prevailing direction of the Wind ...	S. & S. E.

\* Height 70 feet 10 inches above ground.











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Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

ate.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.683	29.751	29.612	0.139	84.7	90.5	81.0	9.5
2	.638	.691	.560	.131	83.8	88.9	81.5	7.4
3	.610	.657	.543	.114	84.8	90.2	81.0	9.2
4	.630	.676	.583	.093	83.1	87.2	81.0	6.2
5	.645	.701	.584	.117	79.8	86.0	78.5	2.1
6	.661	.716	.590	.126	81.5	85.0	79.0	6.0
7	.620	.678	.535	.143	82.9	88.4	79.0	9.4
8	.550	.62	.466	.166	82.5	88.9	79.5	9.4
9	.595	.59	.457	.132	80.4	83.7	77.8	5.9
0	.630	.729	.543	.186	81.5	86.0	79.0	7.0
1	.716	.770	.654	.116	84.3	90.8	79.2	11.6
2	.721	.767	.656	.111	85.0	91.7	81.8	9.9
3	.715	.774	.633	.141	81.6	89.0	80.8	8.2
4	.713	.773	.633	.140	84.0	90.6	80.5	10.1
5	.708	.751	.630	.121	83.9	90.5	80.5	10.0
6	.730	.797	.670	.127	83.1	88.5	80.0	8.5
7	.773	.821	.735	.086	79.0	88.0	77.8	2.2
8	.815	.870	.766	.104	79.6	84.6	78.0	6.6
9	.826	.903	.764	.139	80.6	86.7	78.0	8.7
0	.805	.863	.728	.138	83.1	89.3	78.1	11.2
1	.811	.875	.746	.129	84.3	90.5	79.5	11.0
2	.844	.915	.777	.138	83.8	89.0	80.0	9.0
3	.785	.857	.703	.154	84.2	90.0	80.7	9.3
4	.741	.800	.686	.114	80.8	85.0	78.5	6.5
5	.747	.808	.670	.138	80.9	84.1	79.7	4.4
6	.739	.801	.673	.128	82.6	89.0	79.0	10.0
7	.724	.788	.652	.136	84.5	90.5	81.2	9.3
8	.685	.731	.611	.120	83.3	88.5	79.5	9.0
9	.675	.747	.598	.149	83.7	89.5	79.5	10.0
0	.660	.711	.582	.129	84.8	90.4	80.5	9.9

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	81.3	3.4	78.9	5.8	0.967	10.34	2.08	0.83
2	81.0	2.8	79.0	4.8	.970	.40	1.70	.86
3	81.4	3.4	79.0	5.8	.970	.37	2.09	.83
4	80.1	3.0	78.0	5.1	.940	.09	1.77	.85
5	78.8	1.0	78.1	1.7	.943	.18	0.57	.95
6	79.7	1.8	78.4	3.1	.952	.25	1.06	.91
7	80.0	2.9	78.0	4.9	.940	.09	.70	.86
8	79.6	2.9	77.6	4.9	.928	9.97	.67	.86
9	78.5	1.9	77.2	3.2	.916	.89	.05	.90
10	79.5	2.0	78.1	3.4	.943	10.16	.15	.90
11	80.7	3.6	78.2	6.1	.946	.13	2.15	.83
12	81.7	3.3	79.4	5.6	.983	.49	.04	.84
13	80.9	3.7	78.3	6.3	.949	.16	.23	.82
14	80.5	3.5	78.0	6.0	.940	.07	.10	.83
15	79.9	4.0	77.1	6.8	.913	9.78	.35	.81
16	79.0	4.1	76.1	7.0	.885	.50	.36	.80
17	77.5	1.5	76.4	2.6	.893	.66	0.84	.92
18	78.1	1.5	77.0	2.6	.910	.83	.86	.92
19	79.0	1.6	77.9	2.7	.937	10.10	.91	.92
20	79.8	3.3	77.5	5.6	.925	9.92	1.94	.84
21	80.7	3.6	78.2	6.1	.946	10.13	2.15	.83
22	80.6	3.2	78.4	5.4	.952	.21	1.89	.84
23	80.5	3.7	77.9	6.3	.937	.04	2.20	.82
24	79.0	1.8	77.7	3.1	.931	.04	1.03	.91
25	79.5	1.4	78.5	2.4	.955	.31	0.79	.93
26	80.0	2.6	78.2	4.4	.946	.17	1.51	.87
27	81.2	3.3	78.9	5.6	.967	.34	2.01	.84
28	80.1	3.2	77.9	4.5	.937	.06	1.87	.84
29	80.5	3.2	78.3	5.4	.949	.18	.89	.84
30	80.9	3.9	78.2	6.6	.946	.11	2.35	.81

All the Hygrometrical elements are computed by the Greenwich Constants.



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Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahrt.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Sept. 1st.	29.723	29.855	29.513	0.342	81.0	83.5	78.0	5.5
1	.712	.849	.494	.355	80.8	83.0	78.2	4.8
2	.700	.836	.479	.357	80.5	82.8	78.2	4.6
3	.688	.829	.467	.362	80.3	82.4	77.8	4.6
4	.682	.822	.461	.361	80.1	82.0	78.0	4.0
5	.694	.837	.469	.368	80.0	82.0	78.0	4.0
6	.709	.851	.479	.372	80.0	81.8	78.0	3.8
7	.727	.876	.501	.375	80.6	82.5	78.7	3.8
8	.745	.895	.517	.378	82.2	84.0	77.9	6.1
9	.756	.915	.534	.381	83.7	86.3	77.8	8.5
0	.754	.904	.535	.369	85.0	88.5	78.0	10.5
1	.745	.892	.525	.367	85.5	90.0	78.5	11.5
Sept. 2nd.	.723	.864	.519	.345	86.2	89.6	78.5	11.1
1	.698	.836	.493	.343	86.2	91.7	78.8	12.9
2	.670	.821	.473	.348	86.6	90.5	78.5	12.0
3	.650	.802	.457	.345	86.5	90.8	78.5	12.3
4	.646	.811	.462	.349	85.8	90.5	78.7	11.8
5	.645	.811	.469	.342	84.4	89.6	79.0	10.6
6	.657	.803	.480	.323	83.4	87.5	78.9	8.6
7	.676	.817	.506	.311	82.6	86.0	78.2	7.8
8	.702	.844	.531	.313	82.2	85.0	78.5	6.5
9	.724	.856	.545	.311	81.8	84.3	78.0	6.3
0	.733	.874	.532	.342	81.6	84.0	78.1	5.9
1	.730	.862	.525	.337	81.2	83.5	78.0	5.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.



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in the month of September 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.
	o	o	o	o	Inches.	T. gr.	T. gr.
Mid-night.	79.5	1.5	78.4	2.6	0.952	10.25	0.89
1	79.5	1.3	78.6	2.2	.958	.31	.73
2	79.3	1.2	78.5	2.0	.955	.31	.67
3	79.1	1.2	78.3	2.0	.949	.24	.67
4	79.0	1.1	78.2	1.9	.946	.21	.63
5	79.0	1.0	78.3	1.7	.949	.24	.57
6	79.0	1.0	78.3	1.7	.949	.24	.57
7	79.4	1.2	78.6	2.0	.958	.34	.67
8	80.1	2.1	78.6	3.6	.958	.30	1.24
9	80.6	3.1	78.4	5.3	.952	.21	.86
10	80.7	4.3	77.7	7.3	.931	9.96	2.57
11	80.8	4.7	77.5	8.0	.925	.88	.84
Noon.	81.0	5.2	77.4	8.8	.922	.83	3.16
1	81.0	5.2	77.4	8.8	.922	.83	.16
2	81.1	5.5	77.8	8.8	.934	.95	.19
3	81.0	5.5	77.7	8.8	.931	.92	.18
4	80.6	5.2	77.0	8.8	.910	.71	.12
5	80.4	4.0	77.6	6.8	.928	.93	2.38
6	80.2	3.2	78.0	5.4	.940	10.09	1.87
7	79.9	2.7	78.0	4.6	.940	.09	.59
8	79.8	2.4	78.1	4.1	.943	.14	.40
9	79.7	2.1	78.2	3.6	.946	.17	.23
10	79.6	2.0	78.2	3.4	.946	.19	.15
11	79.5	1.7	78.3	2.9	.949	.22	0.99

All the Hygrometrical elements are computed by the Greenwich Con-



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taken at the Surveyor General's Office, Calcutta,  
in the month of September 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
1	144.5	0.07	S & S by E	...	97.5	☁ i to 8 A. M., ☁ i to 7, B to 11 P. M. T at 4 P. M. Slight R between 4 & 5 P. M.
2	138.6	0.04	S by E & Variable	0.5	76.1	Chiefly ☁ i & ☁ i. T at 12½, 1 & 3 P. M. L at 12½ & 8 P. M. Light R at 1 P. M.
3	142.0	...	S by W & E	...	38.2	B to 5, S to 10 A. M. ☁ i to 3. ☁ i to 11 P. M. A smart shock of an earthquake at 9-17-22 A. M.
4	133.0	0.11	S S E	1.0	168.5	Sheet L on W from 8 to 11 P. M. S to 7 A. M., ☁ i to 4, ☁ i to 6, ☁ i to 8, ☁ i to 11 P. M. Sheet L on N at Midnight & 1 A. M. Slight R after intervals from 10 A. M. to 8 P. M.
5	...	2.14	S E & S S E	1.8	224.1	O. T between 9 & 10 A. M. R nearly the whole day.
6	129.3	0.97	S S E	...	155.4	O to 7 A. M., ☁ i to 6, O to 9, B to 11 P. M. T & L at 3, 4 A. M. & 7½ P. M. R at 4, 5 A. M., 2½ & 6½ P. M.
7	143.5	0.16	S E & S S E	0.6	142.0	B to 3, Scuds to 8 A. M., ☁ i to 5, ☁ i & ☁ i to 11 P. M. T at 1½ P. M. Slight R after intervals from 8½ A. M. to 5½ P. M.
8	143.7	0.09	E S E & S by E	1.3	208.6	B to 2. ☁ i to 10 A. M., ☁ i to 8, O to 11 P. M. Sheet L on NW at 11 P. M. Light R at 7½, 11½ A. M., 12, 2½ & 8½ P. M.
9	121.3	0.31	S	...	168.9	O to 2, ☁ i to 11 P. M. R after intervals from Midnight to 11½ A. M.
10	120.0	0.02	S & S S E	0.8	168.0	Chiefly S. Sheet L on W at 10 P. M. Light R at 3½, 11 A. M. & 3 P. M.
11	149.0	...	S S E, E S E & S [by W	...	114.0	B to 2, S to 8 A. M., ☁ i to 5, ☁ i to 11 P. M.

☁ i Cirri, — i Strati, ☁ i Cumuli, ☁ i Cirro-strati, ☁ i Cumulo-strati, ☁ i Nimbi,  
☁ i Cirro, cumuli-B clear, S straton, O overcast, T thunder, L lightning,  
R. rain, D, drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of September 1875.*

## Solar Radiation, Weather, &amp;c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches.		lb.	Miles.	
12	147.8	...	S by W & S	...	62.7	B to 7 A. M., $\sim$ i to 7, 11 to P. M. T at 2 P. M. between 6 & 7½ P. M.
13	146.0	...	S S E & E S E	...	76.3	S to 8 A. M., $\sim$ i to 12, 9, $\sim$ i to 11 P. M. D at 7½
14	140.2	0.04	E & S E	1.0	109.5	$\sim$ i to 8 A. M., $\sim$ i to 4, S $\sim$ i to 11 P. M. T between 4 P. M. L at 3½ P. M. Light 3½ & 5 P. M.
15	145.0	0.02	E	5.0	155.1	$\sim$ i to 5, O to 7 A. M., $\sim$ S to 11 P. M. T at 3 & 4½ Sheet L between 6 & 7 Light R at 4½ P. M.
16	138.5	0.07	E, E S E & S E	1.0	211.0	$\sim$ i to 7 A. M., $\sim$ i to 4, 11 P. M. Slight R at 4½ A.
17	...	0.21	E & E S E	0.8	265.3	$\sim$ i to 5 A. M., O to 6, 11 P. M. Slight R from 7 to 2 P. M.
18	123.0	0.56	E by S & S E	2.6	171.9	$\sim$ i to 7 A. M., O to 11 T at 1½, 2 & 4 P. M. R at 10 & from 12½ to 6 P. M.
19	141.0	0.64	S S E & S	...	95.2	S to 1, $\sim$ i to 7 A. M., 12, O to 4, $\sim$ i to 6, B to 11 T at 12½ & 1 P. M. R from to 5 P. M.
20	149.0	...	S & S S W	...	68.7	B to 4, $\sim$ i to 9 A. M., 6, B to 11 P. M.
21	152.2	...	S by W & S S W	...	96.1	B to 3, $\sim$ i to 7 A. M., $\sim$ i to 6, B to 11 P. M. Sh between 6 & 7 P. M.
22	148.2	...	S S W	...	109.3	$\sim$ i to 7 A. M., $\sim$ i to 4, 11 to P. M. Sheet L at 8½ P. M.
23	152.0	...	S S W & S	...	128.9	$\sim$ i to 7 A. M., $\sim$ i to 7, 11 P. M. T & L between 1 P. M. D at 6½ P. M.

$\sim$  i Cirri, — i Strati,  $\sim$  i Cumuli,  $\sim$  i Cirro-strati,  $\sim$  i Cumulo-strati,  $\sim$  i N  
 $\sim$  i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L light  
R. rain, D. drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1875.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	<sup>o</sup>	Inches.		lb	Miles.	
24	133.5	1.05	S S W & Variable	...	133.0	☾ i to 1. O to 3, ☾ i to 7 A. M., ☾ i to 12, O to 11 P. M. T from Midnight to 3 A. M. & 12½ to 2 P. M. L from Midnight to 3 A. M. & at 6½ P. M. R from 1½ to 3 & 10½ A. M. to 3 P. M.
25	113.0	0.09	S S W	...	48.6	S to 2, O to 6 A. M., ☾ i to 12, O to 3, ☾ i to 6, B to 11 P. M. T at 4 & from 9½ A. M. to 1 P. M. Sheet L at Midnight, 1 A. M. 8 & 11 P. M. Slight R at 4, 11 A. M., 1 & 2 P. M.
26	139.0	0.04	S by W & S W	...	59.4	☾ i to 1, B to 5 A. M., ☾ i to 6, O to 11 P. M. T from 5 to 7 P. M. L at Midnight 1 A. M., 7, 8 & 11½ P. M. Light R at 12, 1, 4½ & 7 P. M.
27	146.0	0.02	S W & S by W	...	67.0	B to 3 A. M., ☾ i to 7, ☾ i & ☾ i to 11 P. M. T at 4, 5 A. M. & 5½ P. M. L at 4, 5 A. M. & 7 P. M. Light R at 5 & 6 A. M.
28	141.2	0.74	S W & S S W	...	113.8	S to 1, ☾ i to 9 A. M., ☾ i to 3, O to 11 P. M. T at 3½, 4½ & 5½ P. M. L from Midnight to 5 A. M. & 8 to 11 P. M. R from 5 to 8 P. M.
29	135.6	0.02	S S W & S	...	58.7	S to 2, ☾ i to 7 A. M., ☾ i to 6, B to 11 P. M. Sheet L from 7 to 9 P. M. T & Light R at Noon.
30	146.0	...	S W & Variable	...	66.4	☾ i to 7 A. M., ☾ i to 7, B to 11 P. M.

☾ i Cirri — i Strati, ☾ i Cumuli, — i Cirro-strati, ☾ i Cumulo-strati ☾ i Nimb,  
☾ i Cirro-Cumuli, B clear, S stratoni, O overcast, T thunder, L lightning  
& rain, D. drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
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in the month of September 1875.*

## MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month ... ..	29.704
Max. height of the Barometer occurred at 9 A. M. on the 22nd ...	29.915
Min. height of the Barometer occurred at 3 P. M. on the 9th ...	29.457
Extreme range of the Barometer during the month ... ..	0.458
Mean of the daily Max. Pressures ... ..	29.765
Ditto ditto Min. ditto ... ..	29.635
Mean daily range of the Barometer during the month ... ..	0.130

	°
Mean Dry Bulb Thermometer for the month ... ..	82.8
Max. Temperature occurred at 1 P. M. on the 12th ... ..	91.7
Min. Temperature occurred at 3 & 9 A. M. on the 9th & 17th ...	77.8
Extreme range of the Temperature during the month ... ..	13.9
Mean of the daily Max. Temperature ... ..	87.9
Ditto ditto Min. ditto, ... ..	79.7
Mean daily range of the Temperature during the month ... ..	8.2

Mean Wet Bulb Thermometer for the month ... ..	80.0
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	2.8
Computed Mean Dew-point for the month ... ..	78.0
Mean Dry Bulb Thermometer above computed mean Dew-point ...	4.8
Mean Elastic force of Vapour for the month ... ..	Inches. 0.940

	Troy grain.
Mean Weight of Vapour for the month ... ..	10.09
Additional Weight of Vapour required for complete saturation ...	1.66
Mean degree of humidity for the month, complete saturation being unity	0.86

Mean Max. Solar radiation Thermometer for the month ... ..	° 139.4
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	Inches.
Rained 24 days,—Max. fall of rain during 24 hours ... ..	2.14
Total amount of rain during the month ... ..	7.41
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	6.86
Prevailing direction of the Wind ... ..	S, S, S, W. & S, S, E.

\* Height 70 feet 10 inches above ground.











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taken at the Surveyor General's Office, Calcutta,  
in the month of October 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Falt.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.683	29.729	29.637	0.092	86.5	91.8	82.2	9.6
2	.708	.751	.661	.090	84.8	90.0	81.8	8.2
3	.740	.785	.685	.100	85.4	91.5	79.5	12.0
4	.766	.822	.712	.110	84.6	88.0	81.0	7.0
5	.763	.815	.707	.108	83.8	88.0	81.0	7.0
6	.784	.842	.740	.102	83.9	89.2	79.5	9.7
7	.816	.876	.763	.113	83.4	89.6	77.0	12.6
8	.816	.870	.752	.118	83.6	89.0	78.7	10.3
9	.836	.896	.791	.105	83.0	89.3	77.5	11.8
10	.885	.942	.835	.107	81.2	86.5	75.5	11.0
11	.896	.961	.850	.111	79.2	86.2	73.0	13.2
12	.816	.890	.746	.144	79.3	85.6	73.0	12.6
1	.780	.833	.728	.105	81.2	87.4	76.0	11.4
2	.826	.881	.786	.095	81.7	88.5	74.5	14.0
3	.866	.931	.818	.113	79.6	84.5	76.5	8.0
4	.850	.920	.814	.106	76.0	77.8	74.7	3.1
5	.843	.899	.790	.109	79.5	86.5	75.0	11.5
6	.843	.896	.782	.114	82.3	88.9	77.0	11.9
7	.820	.876	.766	.110	82.0	86.5	78.5	8.0
8	.854	.910	.803	.107	81.2	88.0	78.2	9.8
9	.910	.976	.855	.121	82.1	87.4	79.0	8.4
10	.902	.961	.845	.116	79.8	84.5	77.9	6.6
11	.892	.953	.844	.109	74.8	77.5	73.0	4.5
12	.881	.961	.811	.150	77.1	82.5	73.0	9.5
1	.858	.930	.785	.145	79.8	85.5	74.8	10.7
2	.864	.937	.804	.133	79.8	86.4	73.5	12.9
3	.866	.944	.804	.140	80.9	87.6	75.0	12.6
4	.844	.928	.796	.132	81.1	87.5	74.3	13.2
5	.824	.905	.776	.129	81.2	87.5	76.5	11.0
6	.848	.931	.797	.134	80.8	87.7	75.0	12.7
7	.866	.947	.816	.131	79.2	86.1	73.0	13.1

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived, from the hourly observations, made at the  
several hours during the day.



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taken at the Surveyor General's Office, Calcutta,  
in the month of October 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	80.8	5.7	77.4	9.1	0.922	9.83	3.27	0.75
2	80.6	4.2	77.7	7.1	.931	.96	2.50	.80
3	79.9	5.5	76.0	9.4	.882	.43	3.25	.74
4	80.5	4.1	77.6	7.0	.928	.93	2.46	.80
5	80.1	3.7	77.5	6.3	.925	.92	.18	.82
6	76.7	7.2	71.7	12.2	.768	8.23	3.90	.68
7	76.7	6.7	72.0	11.4	.776	.31	.65	.70
8	76.9	6.7	72.2	11.4	.781	.36	.67	.70
9	76.2	6.8	71.4	11.6	.761	.15	.67	.69
10	72.6	8.6	66.6	14.6	.651	6.99	4.22	.62
11	70.0	9.2	63.6	15.6	.590	.36	.20	.60
12	72.4	6.9	67.6	11.7	.672	7.26	3.33	.69
13	73.1	8.1	67.4	13.8	.668	.18	4.03	.64
14	73.3	8.4	67.4	14.3	.668	.18	.19	.63
15	75.8	3.8	73.1	6.5	.803	8.67	2.02	.81
16	74.8	1.2	74.0	2.0	.827	9.00	0.60	.94
17	77.0	2.5	75.2	4.3	.860	.30	1.36	.87
18	78.1	4.2	75.2	7.1	.860	.24	2.34	.80
19	78.5	3.5	76.0	6.0	.882	.48	1.99	.83
20	78.6	2.6	76.8	4.4	.905	.75	.46	.87
21	78.3	3.8	75.6	6.5	.871	.35	2.16	.81
22	75.4	4.4	72.3	7.5	.783	8.44	.31	.79
23	72.6	2.2	71.1	3.7	.753	.21	1.05	.89
24	74.4	2.7	72.5	4.6	.787	.54	.38	.86
25	75.2	4.6	72.0	7.8	.776	.36	2.39	.78
26	74.5	5.3	70.8	9.0	.746	.05	.70	.75
27	75.0	5.9	70.9	10.0	.748	.07	3.03	.73
28	75.1	6.0	70.9	10.2	.748	.07	.10	.72
29	74.3	6.9	69.5	11.7	.715	7.69	.52	.69
30	74.3	6.5	69.7	11.1	.720	.76	.31	.70
31	71.3	7.9	65.8	13.4	.634	6.86	.70	.65

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1875.*

by Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
	Max.	Min.	Diff.		Max.	Min.	Diff.
Inches.	Inches.	Inches.	Inches.	°	°	°	°
29.832	29.914	29.685	0.229	79.0	84.0	74.1	9.9
.822	.910	.677	.233	78.6	83.5	74.0	9.5
.814	.906	.670	.236	78.2	82.8	73.8	9.0
.807	.893	.660	.233	77.8	82.6	73.6	9.0
.807	.897	.646	.251	77.4	82.6	73.5	9.1
.820	.906	.662	.244	77.1	82.5	73.2	9.3
.837	.925	.682	.243	76.8	82.2	73.0	9.2
.857	.951	.699	.252	77.3	83.2	73.0	10.2
.879	.972	.724	.248	79.4	85.5	73.5	12.0
.891	.975	.729	.246	81.9	87.5	73.7	13.8
.890	.976	.729	.247	83.6	89.2	74.8	14.4
.875	.958	.721	.237	84.8	90.5	75.1	15.4
.849	.932	.705	.227	85.3	91.5	75.0	16.5
.825	.910	.679	.231	86.0	91.2	75.0	16.2
.801	.878	.665	.213	86.1	91.3	74.7	16.6
.785	.869	.641	.228	86.1	91.8	74.7	17.1
.781	.864	.637	.227	85.6	91.5	74.7	16.8
.785	.877	.639	.238	84.6	90.5	74.5	16.0
.795	.890	.660	.230	82.8	88.0	74.0	14.0
.810	.898	.671	.227	81.7	87.0	73.8	13.2
.831	.907	.694	.213	80.9	86.0	74.0	12.0
.844	.927	.702	.225	80.3	85.5	73.9	11.6
.850	.934	.708	.226	79.8	85.0	73.8	11.2
.844	.922	.714	.208	79.2	84.4	73.8	10.6

° Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
nometer Means are derived from the observations made at the several  
; during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	76.5	2.5	74.7	4.3	0.816	9.16	1.34	0.87
1	76.1	2.5	74.3	4.3	.835	.05	.33	.87
2	75.8	2.4	74.1	4.1	.830	.00	.25	.88
3	75.5	2.3	73.9	3.9	.824	8.94	.19	.88
4	75.2	2.2	73.7	3.7	.819	.89	.12	.89
5	74.9	2.2	73.4	3.7	.811	.80	.12	.89
6	74.6	2.2	73.1	3.7	.803	.72	.11	.89
7	74.8	2.5	73.0	4.3	.801	.69	.29	.87
8	75.0	4.4	71.9	7.5	.773	.34	2.28	.79
9	75.3	6.6	70.7	11.2	.744	.00	3.44	.70
10	75.6	8.0	70.0	13.6	.727	7.78	4.25	.65
11	75.8	9.0	69.5	15.3	.715	.64	.82	.61
Noon.	75.9	9.4	69.3	16.0	.711	.58	5.06	.60
1	75.9	10.1	68.8	17.2	.699	.45	.46	.58
2	76.0	10.1	68.9	17.2	.701	.48	.47	.58
3	75.8	10.3	68.6	17.5	.695	.39	.56	.57
4	75.8	9.8	68.9	16.7	.701	.48	.28	.57
5	76.3	8.3	70.5	14.1	.739	.90	4.49	.64
6	77.0	5.8	72.9	9.9	.797	8.56	3.19	.73
7	77.1	4.6	73.9	7.8	.824	.87	2.50	.78
8	76.9	4.0	74.1	6.8	.830	.94	.16	.80
9	73.8	3.5	74.3	6.0	.835	9.01	1.90	.83
10	76.6	3.2	74.4	5.4	.838	.06	.69	.84
11	76.4	2.8	74.4	4.8	.838	.06	.50	.86

All the Hygrometrical elements are computed by the Greenwich Constants.



*ct of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1875.*

Solar Radiation. Weather, &c.

radiation.	Rain Gauge 1½ ft. above Ground.	WIND.		General aspect of the Sky.
		Prevailing direction.	Max. Pressure Daily Velocity.	
Inches			lb Miles.	
3.9	...	N & W N W	98.9	B to 2, \i to 7, \i to 9 A. M., Ci to 4, \i to 6, B to 11 P. M.
3.0	0.07	W & S S W	74.6	B to 3, \i to 5, Ci to 7, B to 9 A. M., Ci to 4, \i to 6, B to 11 P. M. Light R at 12 & 4½ P. M.
4.0	...	S E & E N E	64.6	B to 5, \i to 8, B to 11 A. M., Ci to 5, \i to 11 P. M.
3.0	...	S S W	69.2	S to 10 A. M., O to 8, S to 11 P. M. D at Noon.
2.0	...	S by W & N W	57.8	S to 5 A. M., \i to 12, O to 2, S to 5, B to 11 P. M. T at 11½ A. M.
1.7	...	S by W & N by W	119.3	B to 3 A. M., \i to 4, \i to 9, O to 11 P. M.
3.6	...	N by W, E & N	113.3	B to 6, \i to 9 A. M., \i & Ci to 11 P. M.
3.8	...	N N W & W by	63.8	\i to 2, \i to 5, \i to 7, B to 10 A. M., Ci to 6, B to 8, \i to 11 P. M.
3.8	...	W S W & N N W	104.6	B to 6, \i to 9, B to 11 A. M., Ci to 5, B to 9, \i to 11 P. M.
4.0	...	N N E & N W	122.0	\i to 2 A. M., B to 11 P. M.
5.0	...	N W	99.0	B.
9.0	...	S W	80.2	\i to 3, \i to 7, Ci to 11 A. M., \i to 3, \i to 11 P. M.
5.0	...	N N W & N W	125.3	\i to 4, \i to 7, B to 11 A. M., Ci to 5, \i to 11 P. M.
7.5	...	N N W & N	145.5	\i to 7, B to 11 A. M., \i to 6, \i to 11 P. M.
3.0	0.45	S E, E & N E	99.9	B to 5, \i to 8 A. M., O to 12, \i to 11 P. M. Sheet L at 5 P. M. R at 11½ A. M., 4 & 10 P. M.
.	2.22	N E & E S E	174.4	O to 5, \i to 11 P. M. Sheet. L at 1 & 5 A. M. R from 2 A. M to 4 P. M.
3.0	0.06	E	146.2	\i & \i to 3 A. M., Ci to 4, \i to 8, \i to 11 P. M. Light R at 5½ & 7 A. M.

i, —i Strati, Ci Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,  
ro, cumuli-B clear, S strati, O overcast, T thunder, L lightning,  
n, D, drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
the in month of October 1875.*

## Solar Radiation, Weather, &amp;c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
		Inches		lb	Miles.	
18	140.8	...	E by N & S S W	...	77.0	Λi to 8 A. M., Λi to 6, B to 11 P. M.
19	127.0	...	S S W, S W & W	...	55.1	B to 1, Λi to 9 A. M., Λi to 3, Λi to 11 P. M. Slightly foggy at 7 & 8 P. M.
20	138.0	0.26	W S W & E	...	56.1	Λi to 8 A. M., Λi & Λi to 1, O to 7, B to 9, S to 11 P. M. T at 2 P. M. Slight R at 10½ A. M. & between 2 & 3 P. M.
21	134.5	...	E by N & E	...	90.4	O to 1 A. M., Λi to 5, O to 11 P. M.
22	135.0	...	E, E by N & E N E	...	111.1	O to 1, Λi to 6, O 11 P. M.
23	...	0.11	N E & E N E	...	142.8	O. Light R nearly the whole day.
24	135.0	*0.25	E, N E & W N W	...	112.2	O to 8 A. M., Λi to 6, S to 11 P. M. Light R at 2, 2½ & 4 A. M.
25	140.8	...	N by E & N W	...	79.3	S to 1, Λi to 3, B to 10 A. M., Λi to 5, B to 11 P. M.
26	138.0	...	N W & S S W	...	68.5	B to 10 A. M., Λi to 4, B to 11 P. M.
27	139.5	...	S W & N W	...	92.0	B to 11 A. M., Λi to 3, B to 11 P. M. Slightly foggy from 7 to 10 P. M.
28	141.8	...	NW, W & WSW	...	70.8	B to 12, Λi to 6, S to 11 P. M.
29	140.0	...	W S W & N	...	97.7	B to 12, Λi to 4, B to 11 P. M.
30	139.0	...	N by W & N by E	...	85.5	B to 12, Λi to 4, B to 11 P. M.
31	138.5	...	E by N & W by N	...	75.5	B to 12, Λi to 4, B to 11 P. M. B.

\* Fell since 4 P. M. of the 23rd to 4 A. M. of the 24th.

Λi Cirri,—i Strati, Λi Cumuli, Λi Cirro-strati, Λi Cumulo-strati, Λi Nimbi, Λi Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning R. rain, D. drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1875.*

MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.830
Max. height of the Barometer occurred at 10 A. M. on the 21st ...	29.976
Min. height of the Barometer occurred at 4 P. M. on the 1st ...	29.637
Extreme range of the Barometer during the month ... ..	0.339
Mean of the daily Max. Pressures ... ..	29.893
Ditto ditto Min. ditto ... ..	29.777
Mean daily range of the Barometer during the month ... ..	0.116

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	°
Mean Dry Bulb Thermometer for the month ... ..	81.3
Max. Temperature occurred at 3 P. M. on the 1st ... ..	91.8
Min. Temperature occurred at 6 & 7 A. M. on the 11, 12, 23rd, 24th & 31st	73.0
Extreme range of the Temperature during the month ... ..	18.8
Mean of the daily Max. Temperature ... ..	86.9
Ditto ditto Min. ditto, ... ..	76.6
Mean daily range of the Temperature during the month ... ..	10.3

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Mean Wet Bulb Thermometer for the month ... ..	75.9
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	5.4
Computed Mean Dew-point for the month ... ..	72.1
Mean Dry Bulb Thermometer above computed mean Dew-point ...	9.2

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.778

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	Troy grain.
Mean Weight of Vapour for the month ... ..	8.38
Additional Weight of Vapour required for complete saturation ...	2.86
Mean degree of humidity for the month, complete saturation being unity	0.75

	°
Mean Max. Solar radiation Thermometer for the month ... ..	139.7

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	Inches.
Rained 9 days.—Max. fall of rain during 24 hours ... ..	2.22
Total amount of rain during the month ... ..	3.42
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	3.08
Prevailing direction of the Wind ... .. N. W, S, S, W. & E.	

\* Height 70 feet 10 inches above ground.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	68.9	8.0	63.3	13.6	0.584	6.33	3.53	0.64
2	68.4	7.3	63.3	12.4	.584	.35	.16	.67
3	70.5	6.3	66.1	10.7	.640	.94	2.89	.71
4	71.3	6.6	66.7	11.2	.653	7.07	3.09	.70
5	70.7	6.0	66.5	10.2	.648	.05	2.75	.72
6	70.5	7.0	65.6	11.9	.630	6.83	3.21	.68
7	69.7	7.3	64.6	12.4	.609	.62	.27	.67
8	68.6	7.7	63.2	13.1	.582	.32	.37	.65
9	68.2	7.5	62.9	12.8	.576	.26	.25	.66
10	68.1	6.9	63.3	11.7	.584	.35	2.96	.68
11	68.6	7.0	63.7	11.9	.591	.43	3.05	.68
12	68.9	6.6	64.3	11.2	.603	.57	2.89	.70
13	69.4	6.5	64.8	11.1	.613	.68	.89	.70
14	69.2	6.1	64.9	10.4	.615	.71	.69	.71
15	67.8	6.6	63.2	11.2	.582	.35	.80	.69
16	67.0	6.9	62.2	11.7	.563	.14	.87	.68
17	65.8	7.1	60.1	12.8	.525	5.71	.99	.66
18	65.1	7.1	59.4	12.8	.513	.61	.94	.66
19	64.4	7.2	58.6	13.0	.499	.47	.93	.65
20	64.4	6.9	58.9	12.4	.504	.53	.80	.66
21	65.6	5.9	60.9	10.6	.539	.91	.47	.70
22	65.0	6.5	59.8	11.7	.520	.69	.69	.68
23	62.2	8.3	55.6	14.9	.452	4.97	3.16	.61
24	61.6	7.4	55.7	13.3	.453	5.00	2.76	.64
25	62.6	7.0	57.0	12.6	.473	.20	.70	.66
26	62.7	7.0	57.1	12.6	.475	.22	.71	.66
27	63.4	6.7	58.0	12.1	.489	.38	.65	.67
28	64.5	6.1	59.6	11.0	.516	.67	.48	.70
29	65.0	6.0	60.2	10.8	.527	.78	.47	.70
30	67.1	5.4	62.8	9.7	.574	6.28	.35	.73

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.985	30.087	29.872	0.215	70.0	75.2	64.5	10.7
1	.977	.084	.868	.216	69.4	74.8	64.1	10.7
2	.968	.072	.869	.203	68.8	74.0	63.7	10.3
3	.959	.061	.873	.188	68.2	73.3	63.0	10.3
4	.963	.061	.881	.180	67.6	73.0	62.0	11.0
5	.978	.084	.896	.188	67.1	72.8	61.8	11.0
6	.997	.108	.911	.197	66.5	72.5	61.5	11.0
7	30.018	.121	.930	.191	66.7	73.0	61.3	11.7
8	.041	.140	.958	.182	69.6	75.0	63.4	11.6
9	.058	.149	.976	.173	73.8	79.0	68.3	10.7
10	.058	.149	.980	.169	77.0	81.0	70.8	10.2
11	.036	.129	.956	.173	79.3	82.8	74.0	8.8
Noon.	.008	.097	.928	.169	80.6	84.9	76.8	8.1
1	29.976	.068	.902	.166	81.5	85.0	77.4	7.6
2	.952	.044	.883	.161	82.1	85.5	78.0	7.5
3	.939	.035	.869	.166	82.0	86.0	77.5	8.5
4	.937	.027	.867	.160	80.6	84.5	76.5	8.0
5	.943	.041	.877	.164	79.0	83.0	75.0	8.0
6	.954	.049	.886	.163	76.3	80.3	72.5	7.8
7	.970	.062	.902	.160	74.6	79.0	70.0	9.0
8	.989	.081	.917	.164	73.3	77.8	68.7	9.1
9	.999	.097	.924	.173	72.3	76.7	67.8	8.9
10	30.005	.106	.930	.176	71.3	75.9	66.7	9.2
11	29.999	.093	.927	.166	70.4	75.3	65.4	9.9

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of November 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity complete saturation.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid-night.	66.5	3.5	63.7	6.3	0.591	6.51	1.49	0
1	65.9	3.5	63.1	6.3	.580	.39	.47	
2	65.4	3.4	62.7	6.1	.572	.31	.40	
3	64.9	3.3	62.3	5.9	.565	.23	.35	
4	64.4	3.2	61.8	5.8	.555	.14	.30	
5	64.0	3.1	61.5	5.6	.550	.09	.23	
6	63.6	2.9	61.3	5.2	.546	.06	.13	
7	63.8	2.9	61.5	5.2	.550	.10	.13	
8	65.2	4.4	61.7	7.9	.554	.09	.81	
9	66.8	7.0	61.9	11.9	.557	.08	2.90	
10	67.7	9.3	61.2	15.8	.544	5.90	3.99	
11	68.2	11.1	60.4	18.9	.530	.72	4.87	
Noon.	68.2	12.4	59.5	21.1	.515	.54	5.47	
1	68.2	13.3	58.9	22.6	.504	.41	.90	
2	68.0	14.1	58.1	24.0	.491	.26	6.25	
3	68.2	13.8	58.5	23.5	.498	.33	.14	
4	67.9	12.7	59.0	21.6	.506	.44	5.57	
5	69.1	9.9	62.2	16.8	.563	6.08	4.42	
6	69.4	6.9	64.6	11.7	.609	.62	3.07	
7	68.9	5.7	64.9	9.7	.615	.71	2.49	
8	68.3	5.0	64.3	9.0	.603	.60	.24	
9	67.8	4.5	64.2	8.1	.601	.58	.00	
10	67.2	4.1	63.9	7.4	.595	.54	1.79	
11	66.6	3.8	63.6	6.8	.590	.48	.62	

All the Hygrometrical elements are computed by the Greenwich Constar



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
d-	29.985	30.087	29.872	0.215	70.0	75.2	64.5	10.7
1	.977	.084	.868	.216	69.4	74.8	64.1	10.7
2	.968	.072	.869	.203	68.8	74.0	63.7	10.3
3	.959	.061	.873	.188	68.2	73.3	63.0	10.3
4	.963	.061	.881	.180	67.6	73.0	62.0	11.0
5	.978	.084	.896	.188	67.1	72.8	61.8	11.0
6	.997	.108	.911	.197	66.5	72.5	61.5	11.0
7	30.018	.121	.930	.191	66.7	73.0	61.3	11.7
8	.041	.140	.958	.182	69.6	75.0	63.4	11.6
9	.058	.149	.976	.173	73.8	79.0	68.3	10.7
10	.058	.149	.980	.169	77.0	81.0	70.8	10.2
11	.036	.129	.956	.173	79.3	82.8	74.0	8.8
m.	.008	.097	.928	.169	80.6	84.9	76.8	8.1
1	29.976	.068	.902	.166	81.5	85.0	77.4	7.6
2	.952	.044	.883	.161	82.1	85.5	78.0	7.5
3	.939	.035	.869	.166	82.0	86.0	77.5	8.5
4	.937	.027	.867	.160	80.6	84.5	76.5	8.0
5	.943	.041	.877	.164	79.0	83.0	75.0	8.0
6	.954	.049	.886	.163	76.3	80.3	72.5	7.8
7	.970	.062	.902	.160	74.6	79.0	70.0	9.0
8	.989	.081	.917	.164	73.3	77.8	68.7	9.1
9	.999	.097	.924	.173	72.3	76.7	67.8	8.9
10	30.005	.106	.930	.176	71.3	75.9	66.7	9.2
11	29.999	.093	.927	.166	70.4	75.3	65.4	9.9

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		h	Miles.	
23	136.0	...	N	...	119.8	B.
24	140.0	...	N by W	...	90.1	B.
25	138.0	...	N by E & N	...	109.2	B. Foggy from 8 to 10 P. M.
26	130.2	...	N & N W	...	83.7	B. Slightly foggy at Mid- night, 1 A. M. & 11 P. M.
27	133.2	...	N W & W by S	...	58.5	B. Foggy from 8 to 11 P. M.
28	133.0	...	S W, S & W N W	...	39.7	B. Slightly foggy from Mid- night to 6 A. M. & at 11 P. M.
29	139.5	...	W N W & W S W	...	49.5	B. Slightly foggy from Mid- night to 8 A. M. & at 8 & 9 P. M.
30	129.7	...	S S E & N W	...	48.5	B to 11 A. M., ̄i to 4, B to 11 P. M. Foggy at 10 P. M.

̄i Cirri,—i Strati, ̄i Cumuli, ̄i Cirro-strati, ̄i Cumulo-strati, ̄i Nimbi,  
̄i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning  
R. rain, D. drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1875.*

Solar Radiation, Weather, &c.

	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches		lb	Miles.	
1	141.0	...	W by N, N W &	...	84.5	B.
2	141.2	...	W N W & W	...	89.5	B.
3	137.4	...	S W & S by W	...	64.6	B.
4	139.2	...	W S W, W & S W	...	95.2	B.
5	130.0	...	S E & S S W	...	57.4	B. Slightly foggy at 6 & 7 A.M.
6	137.0	...	S W & W N W	...	79.2	B to 3, \i to 5, B to 9, \i to 11 P. M. Slightly foggy at 9 & 10 P. M.
7	137.7	...	W, N W, & W by S	...	110.0	B to 4, \i to 10 A. M., \i to 3, \i to 8, B to 11 P. M.
8	143.0	...	W & W by S	...	122.7	B to 1, \i to 4, B to 11 P. M.
9	137.5	...	W, N W & S W	...	88.9	B to 11 A. M., \i to 3, B to 11 P. M.
0	141.5	...	S by E & S W	...	68.6	B. Slightly foggy from Midnight, to 2 A. M.
1	140.0	...	S W & W N W	...	89.0	B.
2	142.0	...	W by N & S W	...	76.1	B. Slightly foggy at Midnight 1 A. M., 8 & 9 P. M.
3	140.0	...	S W & N N W	...	68.8	B
4	147.0	...	N by E & W by S	...	70.0	B to 10 A. M., \i to 3, B to 11 P. M.
5	139.0	...	N by W & S S W	...	74.1	\i to 6, B to 11 P. M.
6	140.0	...	S W & W	...	71.7	B. Slightly foggy at 7, 8 & 11 P. M.
7	137.5	...	W & N N W	...	55.3	B. Slightly foggy from Midnight to 2 A. M.
8	134.4	...	N N W & N	...	94.3	B.
9	134.6	...	N, NNE & N by E	...	112.6	B to 5 A. M., \i to 7, B to 11 P. M. Slightly foggy at 8 & 9 P. M.
10	131.0	...	N N W	...	92.4	\i to 8, B to 11 A. M., \i to 2, \i to 6, B to 11 P. M. Slightly foggy at 11 P. M.
	127.5	...	N N W & W N W	...	82.0	B to 6 A. M., \i to 6, B to 11 P. M. Slightly foggy from 8 to 10 P. M.
	130.0	...	N N W & W by N	...	95.8	B to 3 A. M., \i to 6, B to 11 P. M.

Cirri, — i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,  
 Cirro, cumuli-B clear, S strati, O overcast, T thunder, L lightning,  
 ~ rain, D, drizzle.







*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta;  
in the month of December 1875.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.951	30.029	29.882	0.147	73.3	83.0	65.4	17.6
2	.949	.022	.897	.125	73.9	83.4	66.4	17.0
3	.937	.026	.872	.154	74.3	84.2	66.8	17.4
4	.926	.006	.877	.129	73.9	83.0	66.0	17.0
5	.921	29.986	.867	.119	73.5	80.7	68.5	12.2
6	.996	30.061	.936	.125	73.4	81.0	68.4	12.6
7	30.037	.112	.977	.135	70.5	78.8	63.5	15.3
8	.051	.120	30.001	.119	70.0	79.0	63.2	15.8
9	.078	.170	.001	.169	68.6	76.2	60.0	16.2
10	.033	.124	29.963	.161	70.2	80.0	61.3	18.7
11	.011	.084	.953	.131	69.5	78.5	62.7	15.8
12	29.998	.064	.949	.115	68.5	77.5	61.6	15.9
13	30.035	.129	.981	.148	69.1	79.0	61.4	17.6
14	.023	.103	.962	.141	69.5	79.5	61.5	18.0
15	29.989	.063	.934	.129	68.4	77.2	62.8	14.4
16	.998	.082	.955	.127	68.1	78.0	60.3	17.7
17	30.029	.104	.978	.126	67.5	76.9	60.0	16.9
18	.051	.123	.992	.131	66.6	75.5	59.0	16.5
19	.036	.112	.962	.150	65.9	76.5	57.3	19.2
20	.059	.132	30.006	.126	67.7	76.0	60.0	16.0
21	.043	.136	29.976	.160	67.3	76.8	59.5	17.3
22	.020	.078	.973	.105	67.8	78.0	59.5	18.5
23	.089	.154	30.024	.130	67.3	76.5	59.5	17.0
24	.112	.185	.056	.129	66.6	75.5	58.7	16.8
25	.059	.136	29.977	.159	66.3	76.4	58.5	17.9
26	.018	.079	.958	.121	66.7	75.5	59.0	16.5
27	29.995	.073	.925	.148	66.3	75.5	58.5	17.0
28	.992	.080	.938	.142	67.5	77.5	59.5	18.0
29	30.000	.054	.961	.093	67.7	78.0	59.3	18.7
30	.053	.128	30.000	.128	68.0	78.5	59.5	19.0
31	.033	.101	29.982	.119	67.4	77.0	59.0	18.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of December 1875.*

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—(Continued.)

Date	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean decrease of Humidity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	67.1	6.2	62.1	11.2	0.561	6.13	2.71	
2	68.0	5.9	63.9	10.0	.595	.50	.51	
3	67.4	6.9	62.6	11.7	.570	.22	.90	
4	67.5	6.4	63.0	10.9	.578	.31	.70	
5	67.8	5.7	63.8	9.7	.593	.48	.42	
6	66.9	6.5	61.7	11.7	.554	.04	.83	
7	63.2	7.3	57.4	13.1	.480	5.27	.86	
8	61.0	6.0	59.2	10.8	.509	.60	.40	
9	61.3	7.3	55.5	13.1	.450	4.97	.70	
10	64.2	6.0	59.4	10.8	.513	5.63	.42	
11	62.3	7.2	56.5	13.0	.465	.12	.76	
12	62.4	6.1	57.5	11.0	.481	.31	.34	
13	62.2	6.9	56.7	12.4	.469	.16	.62	
14	63.0	6.5	57.8	11.7	.486	.35	.53	
15	62.9	5.5	58.5	9.9	.498	.49	.13	
16	61.7	6.4	60.6	11.5	.467	.15	.40	
17	61.4	6.1	56.5	11.0	.465	.14	.28	
18	60.1	6.5	54.9	11.7	.441	4.88	.33	
19	60.0	5.9	55.3	10.6	.447	.96	.10	
20	62.2	5.5	57.8	9.9	.486	5.37	.09	
21	61.7	5.6	57.2	10.1	.476	.26	.11	
22	61.2	6.6	55.9	11.9	.456	.04	.44	
23	61.0	6.3	56.0	11.3	.458	.07	.30	
24	60.7	5.9	56.0	10.6	.458	.07	.14	
25	60.5	5.8	55.9	10.4	.456	.06	.09	
26	60.4	6.3	55.4	11.3	.449	4.97	.26	
27	60.8	5.5	56.4	9.9	.464	5.14	.01	
28	61.9	5.6	57.4	10.1	.480	.30	.12	
29	62.3	5.4	58.0	9.7	.489	.40	.06	
30	62.0	6.0	57.2	10.8	.476	.25	.28	
31	61.6	5.8	57.0	10.4	.473	.23	.16	

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	30.019	30.138	29.915	0.223	65.3	71.0	61.5	9.5
1	.009	.116	.896	.220	64.7	70.5	60.4	10.1
2	.002	.103	.881	.222	64.0	70.2	59.5	10.7
3	29.993	.090	.867	.223	63.4	69.7	59.0	10.7
4	.989	.076	.870	.206	62.8	69.4	58.5	10.9
5	30.001	.094	.888	.206	62.2	68.8	57.6	11.2
6	.018	.116	.918	.198	61.7	68.8	57.3	11.5
7	.040	.133	.945	.188	61.6	69.0	57.7	11.3
8	.067	.155	.961	.194	63.9	71.3	60.8	10.5
9	.090	.185	.985	.200	67.9	74.3	62.8	11.5
10	.090	.179	.986	.193	71.6	77.0	66.0	11.0
11	.072	.175	.967	.208	74.3	80.0	70.0	10.0
Noon.	.043	.152	.942	.210	76.3	82.5	72.5	10.0
1	.005	.117	.900	.217	77.4	83.5	74.3	9.2
2	29.980	.080	.879	.201	78.2	84.2	75.2	9.0
3	.965	.063	.872	.191	78.1	83.9	75.3	8.6
4	.961	.056	.874	.182	76.8	82.6	73.7	8.9
5	.969	.060	.872	.188	75.0	80.5	72.2	8.3
6	.981	.082	.877	.205	72.4	77.5	69.0	8.5
7	.997	.102	.899	.203	70.5	75.7	67.5	8.2
8	30.014	.129	.915	.214	69.1	74.3	66.2	8.1
9	.028	.145	.924	.221	67.9	73.0	64.8	8.2
10	.037	.153	.935	.218	66.8	72.2	63.8	8.4
11	.031	.149	.926	.223	65.9	71.7	62.7	9.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1875.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	61.9	3.4	59.2	6.1	0.509	5.66	1.27	0.82
1	61.4	3.3	58.8	5.9	.503	.58	.22	.82
2	60.9	3.1	58.1	5.9	.491	.46	.19	.82
3	60.4	3.0	57.7	5.7	.485	.39	.14	.83
4	59.9	2.9	57.3	5.5	.478	.33	.08	.83
5	59.3	2.9	56.7	5.5	.469	.23	.06	.83
6	59.1	2.6	56.8	4.9	.470	.26	0.93	.85
7	59.1	2.5	56.8	4.8	.470	.26	.91	.85
8	60.4	3.5	57.2	6.7	.476	.29	1.34	.80
9	62.4	5.5	58.0	9.9	.489	.40	2.11	.72
10	63.9	7.7	57.7	13.9	.485	.31	3.09	.63
11	65.0	9.3	58.5	15.8	.498	.42	.70	.59
Noon.	65.2	11.1	57.4	18.9	.480	.20	4.49	.54
1	65.4	12.0	57.0	20.4	.473	.13	.88	.51
2	65.5	12.7	56.6	21.6	.467	.05	5.20	.49
3	65.4	12.7	56.5	21.6	.465	.03	.19	.49
4	65.0	11.8	56.7	20.1	.469	.08	4.75	.52
5	65.6	9.4	59.0	16.0	.506	.51	3.80	.59
6	65.6	6.8	60.2	12.2	.527	.77	2.83	.67
7	64.9	5.6	60.4	10.1	.530	.83	.30	.72
8	64.3	4.8	60.5	8.6	.532	.86	1.92	.75
9	63.5	4.4	60.0	7.9	.523	.78	.73	.77
10	62.9	3.9	59.8	7.0	.520	.75	.51	.79
11	62.3	3.6	59.4	6.5	.513	.68	.38	.81

All the Hygrometrical elements are computed by the Greenwich Constants.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<sup>o</sup>	Inches		lb	Miles.	
1	137.8	...	N E & N by W	...	47.2	B to 1, \i to 6, B to 11 P. M. Slightly foggy from 8 to 10 P. M.
2	138.1	...	S W & W S W	...	80.6	B.
3	139.0	...	S W & N W	...	103.5	B to 11 A. M., \i to 3, B to 11 P. M. Slightly foggy from 8 to 11 P. M.
4	135.5	...	W N W & N by E	...	61.7	B. Slightly foggy at Midnight & 1 A. M. & from 7 to 10 P. M.
5	137.0	...	N	...	105.8	B to 3 A. M., \i to 5, B to 9, \i to 11 P. M. Slightly foggy at 9 P. M.
6	134.0	...	N N E & N W	...	92.7	B to 4, \i to 10 A. M., \i to 6, B to 11 P. M. Slightly foggy at Midnight & from 8 to 11 P. M.
7	137.0	...	N & N by E	...	86.7	B to 6 A. M., \i to 1, \i to 5, B to 11 P. M. Slightly foggy at 10 P. M.
8	133.0	...	N & N N W	...	86.6	B to 3 A. M., \i to 9, B to 11 P. M. Slightly foggy from Midnight to 3 & at 7 A. M.
9	129.0	...	N & N by E	...	140.6	B to 10 A. M., \i to 5, \i to 11 P. M.
10	135.0	...	N by E & N N E	...	178.4	B to 7 A. M., \i to 2, B to 8, \i to 11 P. M. Slightly foggy at 7 & 8 P. M.
11	137.2	...	N & N by E	...	131.1	B to 4 A. M., \i & \i to 6, B to 11 P. M.
12	138.0	...	N by E & N by W	...	162.5	\i to 2 A. M., B to 11 P. M.
13	130.5	...	N by E & N	...	86.9	B.
14	133.0	...	N N W & N by E	...	143.6	\i to 1 A. M., B to 7, \i to 11 P. M. Slightly foggy at 11 P. M.
15	131.0	...	N N E	...	109.5	\i to 2 A. M., \i to 12, \i to 2, B to 11 P. M. Slightly foggy at Midnight & from 8 to 11 P. M.
16	130.5	...	N N E & N by W	...	76.6	B. Slightly foggy from Midnight to 2 A. M.
17	133.0	...	N by W & S S W	...	97.6	B to 12, \i to 2, B to 11 P. M. Slightly foggy at 10 & 11 P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro, cumuli-B clear, S strati, O overcast, T thunder, L lightning, R. rain, D, drizzle.



*Meteorological Observations.*

*Abstract of the Results of the Hourly Meteorological Observation  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1875.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		h	Miles.	
18	125.2	...	E by S, S W & [N W	...	63.4	B. Slightly foggy at Midnig & 1 A. M.
19	127.0	...	N W & N N E	...	95.2	B. Slightly foggy at 11 P. M.
20	131.5	...	W S W & N	...	65.3	Chiefly B. Slightly foggy from Midnight to 3 & at 7 A. M.
21	128.0	...	N by E & W by S	...	75.6	B.
22	132.0	...	W by S & N W	...	56.9	B. Slightly foggy at 9 P. M.
23	130.0	...	N N E & N	...	131.8	B to 12, \i to 2, B to 11 P. M.
24	125.9	...	N by E & W	...	85.4	B. Slightly foggy at 6 A. M. & 9 P. M.
25	129.8	...	W N W & S W	...	60.1	B to 12, \i to 3, B to 11 P. M.
26	128.0	...	N E & N W	...	89.3	Slightly foggy at 9 P. M.
27	130.5	...	[W by S S W, S S W &	...	53.7	B. Slightly foggy from 8 11 P. M.
28	129.0	...	S W	...	37.5	B to 5, \i to 7 A. M., B to 11 P. M.
29	130.8	...	S by W & N N W	...	38.5	B. Slightly foggy from Midnight to 8 A. M. & 7 to 11 P. M.
30	129.0	...	N N W & N N E [W S W	0.2	71.3	B. Foggy from Midnight to 7 A. M. & 8 to 11 P. M.
31	132.0	...	E N E, N W &	...	105.7	B. Slightly foggy at 6 & A. M. B.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimb  
\i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning  
R. rain, D. drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1875.*

MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	30.017
Max. height of the Barometer occurred at 9 A. M. on the 24th ...	30.185
Min. height of the Barometer occurred at 8 A. M. on the 5th ...	29.867
Extreme range of the Barometer during the month ...	0.318
Mean of the daily Max. Pressures ... ..	30.092
Ditto ditto Min. ditto ... ..	29.959
Mean daily range of the Barometer during the month ...	0.133

---

	°
Mean Dry Bulb Thermometer for the month ... ..	69.1
Max. Temperature occurred at 2 P. M. on the 3rd ... ..	84.2
Min. Temperature occurred at 6 A. M. on the 19th ... ..	57.3
Extreme range of the Temperature during the month ...	26.9
Mean of the daily Max. Temperature ... ..	78.4
Ditto ditto Min. ditto, ... ..	61.5
Mean daily range of the Temperature during the month ...	16.9

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Mean Wet Bulb Thermometer for the month ... ..	62.9
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	6.2
Computed Mean Dew-point for the month ... ..	57.9
Mean Dry Bulb Thermometer above computed mean Dew-point ...	11.2

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.488

---

	Troy grain.
Mean Weight of Vapour for the month ... ..	5.37
Additional Weight of Vapour required for complete saturation ...	2.41
Mean degree of humidity for the month, complete saturation being unity	0.69

	°
Mean Max. Solar radiation Thermometer for the month ... ..	132.2

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	Inches.
Rained no days,—Max. fall of rain during 24 hours ... ..	Nil
Total amount of rain during the month ... ..	Nil
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ... ..	Nil
Prevailing direction of the Wind ... .. N. & N. W.	

\* Height 70 feet 10 inches above ground.



Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]



[APPENDIX.]

LIST OF MEMBERS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
ON THE 31<sup>ST</sup> DECEMBER, 1874.



## LIST OF ORDINARY MEMBERS.

The \* distinguishes Non-Subscribing, the † Non-Resident Members,  
and the ‡ Life-Members.

N. B.—Gentlemen who may have changed their residence, since this list was drawn up, are requested to give intimation of such a change to the *Secretaries*, order that the necessary alterations may be made in the subsequent edition. Error or omissions in the following list should also be communicated to the Secretaries.

Gentlemen who are proceeding to Europe, with the intention of not returning India are particularly requested to notify to the *Secretaries*, whether it be their desire to continue as members of the Society, otherwise, in accordance with rule 14 B. the Bye-laws, their names will be removed from the list at the expiration of three years from the time of their leaving India.

Date of Election.			
1860 Dec.	5.	Abdullatíf Khán Bahádur, The Hon., Maulavi.	Calcutta
1868 Sept.	2.	†Adam, R. M., Esq.	Agra
1860 July	4.	†Ahmad Khan, Sayyid, Bahádur, C. S. I.	Benares
1872 April	3.	†Ahsanullah, Khwajah.	Dacca
1860 April	4.	†Aitchison, J. E. T., Esq., M. D.	Mari, Panjáb
1866 Jan.	17.	*Allan, Lieut.-Col. A. S.	Europe
1871 June	7.	†Alexander, J. W., Esq.	Benares
1860 Oct.	3.	Amír Ali Khán Bahádur, Munshí.	Calcutta
1874 June	3.	Amir Ali, Sayyid, Esq.	Calcutta
1865 Jan.	11.	*Anderson, Dr. J., F. L. S.	Yunan Mission
1872 June	5.	†Anderson, A., Esq.	Fattehghur
1871 Sept.	6.	†Atkinson, E. T., Esq., C. S.	Nynce Tal
1855 July	4.	Atkinson, W. S., Esq., M. A., F. L. S.	Calcutta
1869 Feb.	3.	†Attar Singh Bahádur, Sirdár.	Bhadour, Ludia
1870 Feb.	2.	*Baden-Powell, H., Esq., C. S.	Europe
1873 Aug.	6.	†Badgley, Capt. W. F.	Shillong
1859 Aug.	3.	Balaichánd Sinha, Bábu.	Calcutta
1865 Nov.	7.	†Ball, V., Esq., Geol. Survey.	Geol. S. Office
1860 Nov.	1.	Banerjea, Rev. K. M.	Calcutta
1869 Dec.	1.	†Barker, R. A., Esq., M. D.	Birbhum
1873 March	5.	Barclay, G. W. W., Esq., M. A.	Calcutta
1873 Jan.	8.	Bate, Rev. J. D.	Allahabad
1860 July	4.	Batten, G. H. M., Esq., C. S.	Calcutta
1859 May	4.	Bayley, E. C., The Hon'ble., B.C.S., C.S.I.	Calcutta
1861 Feb.	6.	†Bayley, S. C., Esq., B. C. S.	Patna
1873 Feb.	5.	Bayne, R. R., Esq., B. A.	Calcutta
1864 Sept.	7.	†Beames, J., Esq., B. C. S.	Catak



Date of Election.		
1841 April 7.	Beaufort, F. L., The Hon., B. C. S.	Calcutta
1867 July 3.	Belletty, N. A., Esq.	Calcutta
1869 Jan. 20.	Bellew, Dr. P. F.	Bombay Mint
1871 March 1.	Benedict, E., Esq., C. E., M. Inst. C. E.	Calcutta
1862 Oct. 8.	†Bernard, C. E., The Hon., B. C. S.	Nagpur
1872 Aug. 7.	Beverly, H., Esq., C. S.	Calcutta
1864 Nov. 2.	Bhudeva Mukerjea, Bábu.	Berhampur
1874 Nov. 4.	Bhagabati Charn Mallik, Bábu.	Calcutta
1872 Nov. 6.	Bisset, Lieut. W. S. S., R. E.	Calcutta
1873 Dec. 3.	Blackburn, J., Esq.	Calcutta
1857 Mar. 4.	*Blanford, H. F., Esq., A. R. S. M., F. G. S.	Calcutta
1859 Aug. 3.	*Blanford, W. T., A. R. S. M., F. R. S., F. G. S.	Europe
1873 Aug. 6.	†Bligh, W. G., Esq.	Muttra
1873 April 2.	†Blisset, T. T., Esq.	Dacca
1864 April 6.	Blochmann, H., Esq., M. A.	Calcutta
1871 April 5.	†Bourne, T. W., Esq., M. A., M. E. C. E.	Central Provinces
1871 April 5.	†Bourne, Walter, Esq., C. E.	Madapur
1868 Jan. 15.	†Boxwell, J., Esq., C. S.	Dumka
1872 June 5.	†Brooks, W. E., Esq., C. E.	Maghal Sarai
1860 March 7.	†Brandis, Dr. D.	Calcutta
1871 Jan. 4.	Brough, R. S., Esq.	Calcutta
1874 March 4.	†Brown, R. Esq., M. D.	Manipur
1866 Nov. 7.	†Browne, Lieut.-Col. Horace A.	Thayetmyo
1874 April 1.	Bruce, W. D. Esq., C. E.	Calcutta
1871 July 5.	Buckland, C. T., Esq., C. S.	Hughli
1871 Sept. 6.	†Buckle, H., Esq.	N. Arracan
1872 Jan. 3.	*Butcher, W. D., Esq., M. R. C. S.	Europe
1873 Aug. 6.	*Butler, Capt., J.	Samaguting
1869 Jan. 20.	†Cadell, A., Esq., B. A., C. S.	Banda
1863 June 3.	*Campbell, The Hon'ble Sir G., K. C. S. I.	Europe
1873 March 5.	Cappel, A., Esq.,	Calcutta
1860 Jan. 3.	†Carnac, J. H. Rivett, Esq., B. C. S.	Ghazipur
1868 Aug. 5.	†Chandramohan Gosvámi, Pandit.	Gowhaty
1863 Aug. 5.	†Chandranáth Ráy, Rája.	Nator
1872 Dec. 4.	†Chard, Rev. C. H.	Thayetmyo
1874 Aug. 5.	†Chennell, A. W. Esq.	Shillong
1871 Sept. 6.	†Chisholm, R. F., Esq.	Madras
1868 Feb. 5.	†Clark, Lieut. Col. E. G. Bengal Staff Corps.	Kheree, Oudh
1871 March 1.	Clarke, C. B., Esq.	Calcutta
1872 Aug. 7.	†Clutterbuck, Capt. F. St. Quintin.	Peshawar
1874 Nov. 4.	†Constable A. Esq.	Lucknow
1871 Oct. 4.	*Cooke, H. G., Esq., C. S.	Europe
1868 Dec. 2.	†Cooke, J. E., Esq.	Madras
1872 June 5.	*Court, Major M. H.	Europe
1874 March 4.	Crombie A. Esq., M. D.	Calcutta
1873 Aug. 6.	Cunningham, D. D., Esq., M. B.	Calcutta
1874 July. 1.	Cowan, Capt. S. H.	Calcutta



Date of Election.			
1847 June.	2.	†Dalton, Col. E. T., C. S. I., Staff Corps.	Chhota Nagp
1870 May	4.	†Damant, G. H., Esq., C. S.	Cachar
1873 Dec.	3.	†Dames, M. L., Esq., C. S.	Kurnal, Panj
1871 Jan.	4.	*Daukes, F. C., Esq., C. S.	Europe
1861 Nov.	6.	†Davies, The Hon'ble R. H., C. S. I., B. C. S.	Lahore
1869 April	7.	*Day, Dr. F., F. L. S., F. Z. S.	Europe
1856 June	4.	†DeBourbel, Major R., Royal Engrs.	Lucknow
1874 July	1.	Deane, Capt. T.	Calcutta
1870 Feb.	2.	†DeFabeck, F. W. A., Esq., I. M. Service.	Deoli
1872 Aug.	7.	Dejoux, P., Esq.	Calcutta
1869 Oct.	6.	†Delmerick, J. G., Esq.	Delhi
1873 Jan.	8.	†Dennys, H. L., Esq.	Nagpur
1864 July	6.	Devendra Mallik, Bábu.	Calcutta
1862 May	7.	†Dhanapati Singh Dughar, Ráy, Bahádur.	Azimganj
1853 Sept.	7.	Dickens, Col. C. H., C. S. I.	Calcutta
1870 May	4.	*Dobson, G. E., Esq., B. A., M. B., F. L. S.	Europe
1859 Sept.	7.	†Douglas, Col. C.	Lucknow
1869 Feb.	3.	*Drew, F., Esq.	Europe
1874 July	1.	Drummond, Col. H., R. E.	Calcutta
1870 March	8.	†Duke of Edinburgh, His Royal Highness.	Europe
1873 July	2.	†Durand, H. M., Esq., C. S.	Bhágálpur
1867 June	5.	†Duthoit, W., Esq., C. S.	Mirzapur
		Dvijendranath Thakur, Babu.	Calcutta
1871 March	1.		
1863 May	6.	†Edgar, J. W., Esq., B. C. S.	Darjeling
1874 Dec.	2.	†Egerton, R. E., Esq., C. S.	Lahore
1871 Dec.	2.	†Elliot, J., Esq., M. A.	Allahabad
1846 Jan.	7.	*Elliot, Sir Walter, late M. C. S.	Europe
1859 Nov.	2.	†Elliot, C. A., Esq., B. C. S.	Allahabad
1871 Oct.	4.	†Evezard, Col. G. E.	Poona
1863 Oct.	7.	Ewart, J., Esq., M. D.	Calcutta
1859 Dec.	7.	Fath Ali, Maulavi.	Calcutta
1851 May	7.	*Fayrer, Dr. J., C. S. I.	Europe
1863 Jan.	15.	*Fedden, Francis, Esq., Geol. Survey.	Europe
1868 May	6.	†Field, C. D., Esq., M. A., C. S.	Berhampur
1869 Sept.	1.	*Fisher, J. H., Esq., C. S.	Europe
1872 Dec.	4.	*Forbes, Major, J. G., R. E.	Europe
1861 Feb.	6.	†Forest, R., Esq., Civil Engineer.	Dehra
1869 Oct.	12.	*Forlong, Lieut.-Col. J. G. R., M. S. C.	Europe
1863 June	3.	†Forsyth, the Hon. Sir T. D., C. B., K. C. S. I.	Calcutta
1871 Nov.	1.	†Foster, J. M., Esq., M. R. C. P.	Nazira, Assam
1873 July	2.	†Fraser, Capt. E.	Persian Gulf
1869 Sept.	1.	Fryer, Major G. E., Dy. Commissioner.	Sandoway, Ar kan



Date of Election.			
1867 Sept.	4.	Fyfe, The Rev. W. C.	Calcutta
1873 Dec.	3.	†Gamble, J. S., Esq.	Pankabari, Dar- jiling.
1871 June	7.	Gangaprasad Sinha, Babu.	Calcutta
1871 Aug.	2.	†Gangaprasad, Munshi.	Moradabad
1874 July	1.	†Gardner, D. M., Esq.	Azimghar
1859 Aug.	3.	Gastrell, Col. J. E., Supdt. Rev. Sur- vey.	Calcutta
1862 Feb.	5.	†Gauradās Baisák, Bábu.	Birbhum
1867 Sept.	4.	†Gauvain, Capt. V.	
1867 Dec.	4.	Gay, E., Esq., M. A.	Calcutta
1859 Sept.	7.	Geoghegan, J., Esq., B. C. S.	Calcutta
1869 Feb.	3.	†Giriprasád Sing, Thákur.	Allighar
1861 Feb.	6.	†Godwin-Austen, Major H. H., Topogra- phical Survey.	Daphla Expedi- tion
1869 Oct.	6.	†Gomes, A. D. B., Esq.	Sunderbans
1872 Nov.	6.	*Gordon, C. B. P., Esq.	Europe
1862 July	2.	†Gordon, Robert, Esq., C. E.	Henzaday
1869 July	7.	†Gordon, J. D., Esq., C. S. I., C. S.	Mysore
1871 March	1.	Govindacumar, Chaudhuri.	Calcutta
1863 Nov.	4.	*Gowan, Lieut.-Col. J. Y.	Europe
1866 June	6.	Gribble, T. W., Esq., B. C. S.	Calcutta
1861 Sept.	4.	†Griffin, L. H., Esq., B. C. S.	Lahore
1873 Aug.	6.	Girischandra Sinha, Kumara.	Calcutta
1861 Feb.	6.	†Growse, F. S., Esq., M. A., B. C. S.	Mathurá
1871 Jan.	4.	Gunendranath Thakur, Babu.	Calcutta
1864 Dec.	5.	†Gurucharan Dás, Bábu.	Krishnagur
1871 June	7.	Habíburrahman, Maulavi.	Calcutta
1867 July	3.	†Hacket, C. A., Esq., Geol. Survey.	Geol. S. Office
1869 April	3.	*Hæberlin, The Rev. C.	Europe
1866 Jan.	17.	†Hamilton, Lieut.-Col. T. C.	Rangoon
1855 March	7.	†Hamilton, R., Esq.	Wardah
1871 July	3.	Hamilton, Col. O.	Calcutta
1861 March	1.	†Harachandra Chaudhuri, Babu.	Sherepur
1866 Nov.	1.	Harendra Krishna Bahádur, Raja. •	Calcutta
1871 Feb.	1.	†Harkness, T. F., Esq., C. S.	Etah
1861 Feb.	2.	†Harrison, A. S., Esq., B. A.	Allahabad
1859 Oct.	6.	*Haughton, Col. J. C., C. S. I.	Europe
1874 March	4.	Haworth, J. H., Esq.	Calcutta
1873 May	7.	Hector, Rev. John, M. A.	Calcutta
1862 Aug.	6.	Heeley, W. L., Esq., B. A., C. S.	Calcutta
1872 May	1.	Heilgers, W., Esq.	Calcutta
1874 Jan.	7.	Heintze, C., Esq.	Calcutta
1868 Aug.	5.	†Hobart, R. T., Esq., C. S.	Etah



Date of Election.		
1872 Nov.	6.	†Holcombe, Lieut. W. A.
1872 Dec.	4.	*Hoernle, Rev. A. F. R., Ph. D.
1868 Nov.	4.	*Holroyd, Capt. W. R. M.
1873 Jan.	8.	†Houstoun, G. L., Esq.
1863 Jan.	15.	†Howell, M. S., Esq., C. S.
1871 April	5.	Howell, A. P., Esq., C. S.
1866 Feb.	7.	Hoyle, G. W., Esq.
1867 Aug.	7.	†Hughes, T. H., Esq., A. R. S. M., F. G. S.
		Geol. Survey of India.
1873 March	5.	*Hughes, A. J., Esq., C. E.
1866 Jan.	17.	*Hughes, Captain W. G., M. S. C.
1870 Jan.	5.	Hume, Allan O., Esq., C. B., C. S.
1870 June	1.	Hunter, W. W., Esq., LL.D., C. S.
1868 April	1.	Hyde, Col. H., R. E.
1872 Dec.	4.	†Ibbetson, D. C. J., Esq., C. S.
1866 March	7.	†Irvine, W., Esq., C. S.
1871 March	8.	Isaac, T. S., Esq., C. E.
1853 Dec.	7.	†Isvariprasád Singh, Bahádur, Raja.
1874 Feb.	4.	†Jackson, Dr. C. J.
1865 June	7.	†Jaykissen Dás Bahádur, Rájá, C. S. I.
1873 Aug.	6.	Jogeshachandra Datta, Babu.
1866 Feb.	7.	†Johnson, W. H., Esq.
1862 March	5.	*Johnstone, Major J. W. H., Dy. Commis- sioner.
1867 Dec.	4.	*Johnstone, Capt. J.
1873 Dec.	3.	†Johor, H. H., Maharaja of, K. C. S. I., K. C. C. I.
1873 April	2.	†Jones, F., Esq.
1869 April	7.	Kabíruddín Ahmad, Maulavi.
1871 May	3.	Kaliprasanna Ghosh, Babu.
1861 Dec.	4.	†Kempson, M., Esq., M. A.
1874 Dec.	2.	†Khuda Baksh Khan, Maulavi Sahib
1874 April	1.	†Kimber, J., Esq., C. E.
1867 Dec.	4.	King, G., Esq., M. B.
1867 March	6.	†King, Capt. H. W.
1862 Jan.	15.	King, W., Jr., Esq., Geol. Survey of India.
1874 Nov.	4.	Knight, R., Esq.
1867 March	6.	†Knox, G. E., Esq., C. S.
1860 May	5.	Kurz, S., Esq.
1868 Feb.	5.	*Lees, L. H., Esq., M. D.
1859 Dec.	7.	†Leonard, H., Esq., M. A., C. E.
		Assam
		Europe
		Lahore
		JohnstoneC
		Renfrews
		Benares
		Calcutta
		Calcutta
		Geol. S. Off
		Europe
		Europe
		Calcutta
		Calcutta
		Calcutta
		Karnál, Pa
		Saharanpur
		Calcutta
		Benares
		Puri
		Cawnpur
		Calcutta
		Patna
		Europe
		Europe
		New Johor,
		Singapore
		Midnapur
		Calcutta
		Calcutta
		Allahabad
		Patna
		Midnapur
		Calcutta
		P. & O Co.'sC
		Geol. Surv. C
		Calcutta
		Kirwee (Ban
		Calcutta
		Europe
		Europe



Date of Election.		
1870 July 6.	†Lethbridge, E., Esq., M. A.	Krishnagur
1869 June 2.	*Leupolt, J. C., Esq., C. S.	Europe
1873 Feb. 5.	Lewis, T. R., Esq., M. B.	Calcutta
1864 Nov. 2.	Locke, H. H., Esq.	Calcutta
1869 April 7.	†Lockwood, E. D., Esq., C. S.	Monghyr
1866 Jan. 17.	†Low, J., Esq., G. T. S.	Dehra Dhoon
1869 July 7.	Lyall, C. J., Esq., B. A., C. S.	Calcutta
1874 March 4.	Lyall, A. C., Esq., C. S.	Calcutta
1870 April 6.	†Lyman, B. Smith, Esq.	Japan
1866 June 6.	Macdonald, Lieut.-Col. J., Staff Corps.	Calcutta
1873 May 7.	†Mackay, W., Esq., C. E.	Port Blair
1873 Dec. 3.	McLeod, K., Esq., M. D.	Calcutta
1848 April 5.	†MacLagan, Major-General R., R. E., F. R. S. E., F. R. G. S.	Lahore
1867 July 3.	*Macnamara, Dr. C.	Europe
1868 Dec. 2.	†Macauliff, M., Esq.	Montgomery
1874 Jan. 7.	†Magrath, C. F., Esq., C. S.	Bogra
1870 May 4.	†Macnaghten, C., Esq.	Rajkote College, Kattywar
1874 July 1.	Mallock Major, H. A.	Calcutta
1867 April 3.	Mahendralál Sircár, Dr.	Calcutta
1867 April 3.	Mainwaring, Lieut.-Col. G. B.	Calcutta
1852 Nov. 3.	Manickjee Rustamjee, Esq.	Calcutta
1872 Nov. 6.	Man, E. H., Esq.	Port Blair
1869 July 7.	†Markham, A. M., Esq., C. S.	Allahabad
1874 Aug. 5.	Marsh, Capt. H. C.	Barrackpore
1873 July 2.	†Marshall, C. W., Esq.	Berhampur
1873 Aug. 6.	†Marshall, Lieut.-Col. W. E.	Simla
1860 March 7.	Medlicott, H. B., Esq., F. G. S., Geol. Survey of India.	Calcutta
1874 July 5.	†Michell, Capt. T. B.	Gowhatty
1871 Sept. 6.	†Miles, Capt. S. B.	Muskat
1870 July 6.	Miller, A. B., Esq.	Calcutta
1867 June 5.	Milman, R., D. D., The Right Rev. Lord Bishop of Calcutta.	Calcutta
1874 May 6.	†Minchin, F. J. V., Esq.	Madras
1874 July 1.	Molesworth, W. G., Esq., C. E.	Calcutta
1867 March 6.	*Montgomerie, Major T. G., R. E.	Europe
1854 Dec. 6.	Morris, The Hon'ble, G. G., B. C. S.	Calcutta
1854 Oct. 11.	Muir, The Hon'ble Sir W., K. C. S. I., B. C. S.	Calcutta
1862 July 2.	†Napier of Magdala, H. E. Lord R., General G. C. S. I., G. C. B.	Simla
1869 May 5.	Nevill, G. Esq., C. M. Z. S.	Calcutta



Date of Election.		
1865 Feb.	1. †Newal Kishwar, Munshí.	Lucknow
1871 Jan.	4. *Newton, Isaac, Esq.	Europe
1872 May	1. †Niranjan Mukerji, Babu.	Benares
1869 July	7. †Nursing Rao, A. V., Esq.	Vizagapatam
1871 July	5. †Oates, E. W., Esq., C. E.	Pegu
1874 Oct.	4. O'Kinealy, E., Esq., C. S.	Calcutta
1851 June	4. Oldham, T., Esq., LL. D., F. R. S.	Calcutta
1873 Aug.	6. Olpherts, W. J., Esq.	Calcutta
1864 Mar.	2. Palmer, Dr. W. J.	Calcutta
1873 Aug.	6. Parker, J. C., Esq.	Calcutta
1862 May	7. Partridge, S. B., Esq., M. D.	Calcutta
1871 Dec.	6. †Peal, S. E., Esq.	Sibsagar, As
1867 Mar.	6. Pearimohan Mukarji, M. A., Babu.	Uttarparah
1860 Feb.	1. *Pearse, Lieut.-Col. G. G.	Europe
1868 Nov.	4. *Pearson, C. E., Esq., M. A.	Europe
1873 Aug.	6. Pedler, A., Esq.	Calcutta
1869 July	7. †Pell, S., Esq.	Ranigunge
1864 Mar.	2. Pellew, F. H., Esq.	Hughli
1865 Sept.	6. †Peppé, J. H., Esq.	Ranchi
1874 Jan.	7. †Peppe, G. T., Esq.	Pachamba
1868 May	6. Peterson, F. W., Esq.	Calcutta
1835 July	1. *Phayre, Major G., Sir A. P., K. C. S. I., C. B.	Europe
1864 Nov.	2. Phear, The Hon'ble J. B.	Calcutta
1869 Feb.	3. †Pickford, J., Esq., M. A.	Madras
1868 April	1. †Pramathanáth Ráy, Raja.	Digapati
1872 Dec.	4. Pranánath Sarasvati Pandit.	Bhawánipur
1869 Feb.	3. Pratápachandra Ghosha, B. A.	Calcutta
1871 June	7. *Pratt, Capt. C. S., Staff Corps.	Europe
1856 Mar.	5. Rájendralála Mitra, Bábú.	Calcutta
1871 June	7. Rámakrishna Dás, Bábú.	Calcutta
1837 Feb.	1. Rámánáth Tagor, the Hon. Raja, C. S. I.	Calcutta
1874 Dec.	2. †Ram Das Sen, Babu.	Berhampur
1860 Mar.	7. †Reid, H. S., Esq., C. S.	Allahabad
1871 July	5. †Reid, J. R., Esq. C. S.	Azimghar
1872 April	3. Richards, Dr. V.	Goalundo
1868 April	1. Robb, G., Esq.	Calcutta
1863 April	1. †Robertson, C., Esq., C. S.	Mirzapur
1874 May	6. Robinson, Col. D. G., R. E.	Calcutta
1865 Feb.	1. Robinson, S. H., Esq.	Calcutta
1869 July	7. †Ross, Lieut. J. C., R. E.	Bulandshah
1870 Jan.	5. †Ross, Alexander G., Capt., Staff Corps.	Edwardesab
1871 Dec.	6. †Samuells, Capt. W. L.	Manbhum



tion.		
.	7. †Sashagiri Sastri, M. B. A.	Madras
r	4. †Satyánand Ghoshál, Rája.	Benares
.	8. Schlegel, F., Esq.	Calcutta
r	4. Schlich, Dr. W.	Calcutta
.	3. Schwendler, L., Esq.	Calcutta
r	1. †Scully, Dr. J.	Kashgar
r	4. †Shelverton, G., Esq.	Waltair, near Vizagapatam
il	1. †Showers, Lieut.-Col. C. L.	Amballa
e	6. †Sime, J., Esq., B. A.	Delhi
.	7. *Skrefsrud, Rev. L. O.	Europe
.	7. †Sladen, Major E. B.	Amherst
r	5. †Smith, D. Boyes, Esq., M. D.	Dacca
e	3. Smith, V. A. C., Esq., C. S.	Hamirpur
.	2. *Spearman, Capt. H. R.	Europe
r	3. †Stephen, Carr, Esq.	Simla
.	2. †Stewart, R. D., Esq.	Raniganj
il	6. Stewart, R., Esq.	Calcutta
.	7. †St. John, R. T., Esq.	Bassein
t.	4. Stokes, Whitley, Esq.	Calcutta
.	3. †Strachey, The Hon'ble Sir J., K. C. S. I.	Allahabad
.	2. †Stubbs, Lieut.-Col. F. W., Royal Artillery.	Lucknow
r	7. †Sutherland, H. C., Esq., B. C. S.	Sylhet
.	11. Swinhoe, W., Esq.,	Calcutta
t.	6. Tawney, C. H., Esq., M. A.	Calcutta
il	5. Taylor, R., Esq.	Calcutta
.	4. Taylor, Commander A. D., late Indian Navy.	Calcutta
r	2. Temple, The Hon'ble Sir R., K. C. S. I., B. C. S.	Calcutta
.	2. †Theobald, W., Esq., Geological Survey.	Saharanpur
.	6. †Thomson, A., Esq.	Faizabad
e	2. †Thuillier, Col. H. L., R. A., C. S. I., F. R. S.	Calcutta
r	5. †Tolbort, T. W. H., Esq., C. S.	Jhang, Panjab
il	5. *Trefftz, Oscar, Esq.	Europe
e	5. †Tremlett, J. D., Esq., M. A., C. S.	Muzaffargarh
r	3. Trevor, W. S., Major R. E.	Calcutta
il	2. Turnbull, R., Esq.	Calcutta
t.	4. Tween, A., Esq., Geological Survey.	Calcutta
r	6. *Tyler, Dr. J.	Europe
e	2. Udaychánd Datt, Bábu.	Calcutta
il	2. Umesh Chunder Datt, Bábu.	Calcutta
r	7. †Urmstn, H. B., Lieut.	Benares



Date of Election.			
1860 May	2.	*Vanrenen, Major A. D., Bengal Staff Corps.	Europe
1864 Feb.	3.	†Verchère, A. M., Esq., M. D.	Benares
1864 April	6.	†Vijayarāma Gujapati Rāj Munniā Sultān Bahādur, Mahārājah Mirza Vijayanagarām.	Benares
1870 June	1.	†Vrindāvanachandra Mandala, Bábu.	Balasor
1871 Feb.	1.	Waagen, Dr. W.	Calcutta
1869 Aug.	4.	Wáhid Alf, Prince Jahán Qadr Muhammad Bahádur.	Garden Reach
1865 Nov.	1.	Waldie, D., Esq., F. G. S.	Calcutta
1861 May	1.	†Walker, Col. J. T., R. E., F. R. S.	Dehra Doon
1863 Oct.	7.	Waller, W. K., Esq., M. B.	Calcutta
1865 May	3.	Waterhouse, Capt. J., B. S. C.	Calcutta
1874 July	1.	Watt, Dr. George.	Hughli
1869 Sept.	1.	†Westland, J., Esq., C. S.	Nagpur
1867 Feb.	6.	†Westmacott, E. V., Esq., B. A., C. S.	Dinajpur
1862 Oct.	8.	*Wheeler, J. T., Esq.	Europe
1873 April	2.	†White, E., Esq., C. S.	Bijnour
1867 Aug.	7.	†Wilcox, F., Esq.	Purulia
1873 Jan.	8.	†Williams, H. C., Esq., C. S.	Wardha
1873 May	7.	†Williams, G. R. C., Esq., C. S.	Banda
1867 Jan.	16.	†Williamson, Capt. W. J.	Garo Hills
1867 Mar.	6.	Willson, W. G., Esq., B. A.	Calcutta
1871 Mar.	1.	*Willson, James, Esq., B. A.	Dacca
1870 Aug.	3.	*Wilson, R. H., Esq., C. S.	Europe
1866 Mar.	7.	*Wise, Dr. J. F. N.	Europe
1867 July	3.	†Wood, Dr. J. J.	Ranchi
1874 Mar.	4.	†Wood, C. A., Esq.	Rungbir, D ling
1870 Jan.	5.	Wood-Mason, J., Indian Museum.	Calcutta
1873 Aug.	6.	†Woodthorpe, Lieut. R. G., R. E.	Shillong
1869 Sept.	1.	Yadulál Mallik, Bábu.	Calcutta
1868 June	3.	Yatindramohan Tagore, Rājah Bahádur.	Calcutta
1867 Mar.	6.	†Yogendranáth Mallik, Bábu.	Andul
1862		*Yule, Col. H., R. E.	Palermo



## HONORARY MEMBERS.

Section.		
r.	9.	M. Garcin de Tassy, Memb. de l'Institut. Paris
,	6.	Sir John Phillippart. London
y	1.	Count de Noe. Paris
,	7.	Prof. C. Lassen. Bonn
y	6.	Prof. Lea. Philadelphia
o.	4.	Dr. Ewald. Göttingen
,	4.	Right Hon'ble Sir Edward Ryan, Kt. London
r.	30.	Prof. Jules Mohl, Memb. de l'Institut. Paris
t.	1.	Col. W. Munro. London
v.	3.	His Highness the Nawab Nazim of Bengal. Murshidabad
o.	2.	Dr. J. D. Hooker. Kew
r.	8.	Prof. Henry. Princeton U. S.
il	6.	Major-Gen. Sir H. C. Rawlinson, K. C. B. London
y	6.	B. H. Hodgson. Europe
r.	2.	The Hon'ble Sir J. W. Colville, Kt. Europe
r.	7.	Prof. Max Müller. Oxford
r.	7.	Mons. Stanislas Julien. Paris
,	7.	Dr. Robert Wight. London
,	7.	Edward Thomas, Esq. London
,	7.	Dr. Aloys Sprenger. Bern
,	7.	Dr. Albrecht Weber. Berlin
o.	5.	Genl. A. Cunningham, C. S. I. India
,	5.	Prof. Bāpu Déva Sāstri. Benares
,	5.	Dr. T. Thomson. London
,	2.	A. Grote, Esq. London
,	7.	Charles Darwin, Esq. London
,	1.	Sir G. B. Airy. London
ie	5.	Prof. T. H. Huxley. London

## CORRESPONDING MEMBERS.

.	2.	Macgowan, Dr. J. Europe
e	4.	Krämer, Herr A. von. Alexandria
	3.	Porter, Rev. J. Damascus
	4.	Schlagintweit, Herr H. von. Munich
	4.	Smith, Dr. E. Beyrout
	4.	Tailor, J., Esq. Bussorah
	4.	Wilson, Dr. Bombay
r.	4.	Neitner, J., Esq. Ceylon
r.	3.	Schlagintweit, Herr R. von. Giesen
r.	2.	Frederick, Dr. H. Batavia
y	4.	Bleeker, Dr. H. Europe
.	1.	Baker, The Rev. H. E. Malabar
	1.	Swinhoe, R., Esq., H. M.'s Consul. Amoy
il	4.	Haug, Dr. M. Munich
r	3.	Gösche, Dr. R.
.	5.	Murray, A., Esq. London
r	4.	Barnes, R. H., Esq. Ceylon
y	7.	Schlagintweit, Prof. E. von. Munich
	7.	Sherring, Rev. M. A. Benares
.	5.	Foucaux, M. F. H. Paris
	5.	Holmböe, Prof. Christiania



## ASSOCIATE MEMBERS.

Date of Election.			
1838	„ 7.	Karámat Alí, Sayyid.	Hooghly
1865	May 3.	Dall, Rev. C. H.	Calcutta
1874	Feb. 4.	Schaumburgh, J., Esq.	Calcutta
1874	April 1.	Lafont, Rev. F. E., S. J.	Calcutta

## LIST OF MEMBERS WHO HAVE BEEN ABSENT FROM INDIAN SOCIETY FOR THREE YEARS AND UPWARDS.\*

**Rule 14, A.**—In the event of an ordinary Member leaving India, and in further event of his informing the Secretary by letter that he has intention of returning, but desires to retain his privileges as an Ordinary Member, his subscription shall be 12 Rupees per annum, commuted into a single payment of Rs. 100, provided that if any such Member shall hereafter return to India, he shall thereupon become liable to his original subscription, subject to the operation of rule 10 B.

**Rule 14, B.**—After the lapse of three years from the date of a Member leaving India, if no intimation of his wishes shall, in the interval, have been received by the Society, his name shall be removed from the list of Members.

L. H. Lees, Esq., M. D.,

Date of leaving India  
1871

## LOSS OF MEMBERS DURING 1874.

## BY RETIREMENT.

W. Eddowes, Esq., M. D.	Erinpura
G. E. Ward, Esq., C. S.	Fattehghur
C. Brownfield, Esq.	Kamrup
Col. F. H. Rundall, R. E.	Calcutta
Capt. E. H. Steel.	Marri, Panjal
A. Rogers, Esq.	Calcutta
C. Sanderson, Esq.	Calcutta
Lieut. C. T. Bingham.	Allahabad
Lieut. R. Wace, R. A.	Bombay
Col. D. Brown.	Moulmein
E. Buck, Esq., C. S.	Naini Tal.
Capt. E. Swetenham.	Mhow
F. R. Mallet, Esq.	
Babu Syamacharan Sarcar.	Calcutta

## BY DEATH.

Dr. Bhau Daji.	Bombay
Dr. F. Stoliczka.	Yarkand
Babu Pulinavihari Sen.	Berhampore
A. Bond, Esq.	Calcutta
Dr. H. B. Buckle.	Europe

## ELECTION CANCELLED.

Lieut.-Col. G. A. Searle.	Calcutta
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\* This name will be removed from the next list of members unless intimation is meanwhile received from the member of his desire to retain the privileges of ordinary member under the operation of Rule 14 A.



[ APPENDIX. ]

ABSTRACT STATEMENT  
OF  
RECEIPTS AND DISBURSEMENTS  
OF THE  
ASIATIC SOCIETY OF BENGAL  
FOR  
THE YEAR 1874.

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# STATEMEN

## *Abstract of the Cash Accou*

		RECEIPTS.		1874.	1873
ADMISSION FEES.					
Received from Members,		Rs. 1,182 0 0		1,182 0 0	1,424
SUBSCRIPTIONS.					
Received from Members,		8,729 3 0		8,729 3 0	8,296
PUBLICATIONS.					
Sale proceeds of Journal and Proceedings		1,151 0 7			
Subscriptions to ditto		959 9 0			
Refund of Portage Stamps,		13 9 0			
Ditto of Packing Charges,		2 6 0			
				2,126 8 7	1,537
LIBRARY.					
Sale proceeds of Books,		400 2 0			
Refund of Freight,		7 5 6			
Ditto of Postage,		5 5 0			
				412 12 6	316
SECRETARY'S OFFICE.					
Saving of Salary,		18 10 3			
Received fine &c.,		4 3 6			
Refund of Postage Stamps,		0 15 0			
				23 12 9	9
VESTED FUND.					
Interest on the Government Securities from the Bank of Bengal,		449 0 0		449 0 0	238
BUILDING.					
Received from the Right Hon'ble the Secretary of State for India, being the Special House Allowance granted by Government of India from 1st December 1873 to 30th November 1874, @ 400 Rs. per month,		4,800 0 0		4,800 0 0	12,916
D. STOLICZKA MEMORIAL FUND.					
Received Subscriptions to the Fund,		1,240 0 0		1,240 0 0	
MISCELLANEOUS.					
Fund account,		220 3 7			
O. P. Fund,		641 1 5			
Yusuf Ali Munshee,		459 3 10			
Money Lal Bysack,		84 14 8			
F. S. Growse, Esq.,		8 0 0			
Lieut. W. A. Holcombe,		4 8 0			
Josim Duftory,		40 0 0			
Babu Rajendralala Mitra,		1 8 0			
Major G. E. Fryer,		1 0 0			
Rev. A. F. R. Hoernle,		2 14 0			
L. Schwendler, Esq.,		2 6 0			
E. C. Bayley, Esq.,		0 5 0			
Major J. W. H. Johnstone,		12 4 0			
				1,478 4 6	
				Carried over, Rs. 18,963	4 10



No. 1.

*of the Asiatic Society for 1874.*

DISBURSEMENTS.		1874.	1873.
PUBLICATIONS.			
Paid Freight for sending Journal and Proceedings,	Rs. 83 5 0		
Ditto Lithographing and Engraving charges, &c.,	1,199 4 3		
Ditto Printing charges,	5,137 1 3		
Ditto Commission on sale of Books, &c.,	27 7 3		
Ditto Paper for Plates,	204 10 9		
Ditto Subscription to the Hindu Commentator,	10 0 0		
Ditto Purchase of Postage Stamps,	279 2 3		
Ditto Packing charges,	23 5 0		
Ditto Purchase of Journal,	18 0 0		
Ditto Stephen Austen, Esq. for Journal Part II, No. I of 1875, £40,	438 13 9		
Ditto Petty charges,	19 9 9		
		7,440 11 8	7,270 2 10
LIBRARY.			
Paid Salary of Librarian,	840 0 0		
Ditto Establishment,	120 0 0		
Ditto Commission on Sale of Books,	34 15 9		
Ditto Landing charges,	6 8 0		
Ditto Book Binding,	289 7 0		
Ditto Subscription to Medical Gazette,	15 0 0		
Ditto Salary of Punkhaman,	28 8 0		
Ditto Insufficient and Bearing Postage,	2 13 0		
Ditto Subscription to the Calcutta Review,	4 0 0		
Ditto Purchase of Books,	93 12 0		
Ditto Subscription to the Stray Feathers,	22 0 0		
Ditto Ditto to the Indian Antiquary,	3 8 0		
Ditto Lithographing charges,	10 0 0		
Ditto Extra attendance in the Library on the morning,	43 13 6		
Ditto Substantial Teak Wood,	67 12 0		
Ditto Freight,	2 5 0		
Ditto Mr. D. Garrick, for cleaning, repairing, restoring, re-bucking and varnishing 24 oil paintings,	1,065 0 0		
Ditto repairing wood works and finding Hook and Chain where required and hanging ditto,	69 0 0		
	1,134 0 0		
Ditto Petty charges,	13 12 6		
		2,732 2 9	1,518 13 11
SECRETARY'S OFFICE.			
Paid General Establishment,	390 0 0		
Ditto Secretary's Establishment,	2,018 0 0		
Ditto Purchase of Postage Stamps,	168 5 9		
Ditto Stationery,	35 9 9		
Ditto Insufficient and bearing Postage,	3 13 4		
Ditto Meeting charges,	141 5 0		
Ditto Commission on Subscriptions collected,	59 5 6		
	2,816 7 4		
Carried over, Rs. 10,172 14 5			



## RECEIPTS.

1874.

187

	Brought over, Rs.	1,478	4	618,963	4	10	
T. W. H. Tolbort, Esq., .	.	2	5	0			
Babu Upendra Chandra Mukerjee, .	.	2	7	0			
J. Sime, Esq., .	.	0	8	0			
The Government of North Western Provinces,	.	10	2	0			
Lieut.-Col. F. W. Stubbs, .	.	8	6	0			
D. K. Pomeroy, Esq., .	.	3	9	0			
Thakur Giriprasad Sing, .	.	0	4	0			
Raja Joykissen Das Bahadur, .	.	0	4	0			
A. M. Broadley, Esq., .	.	43	0	0			
W. W. Hunter, Esq., .	.	0	4	0			
His Highness The Rao of Kutch, .	.	0	15	0			
W. Theobald, Esq., .	.	28	0	0			
James Beames, Esq., .	.	6	0	0			
E. T. Atkinson, Esq., .	.	15	1	0			
Archbold Constable, Esq., .	.	2	11	8			
C. W. Wilmot, Esq., .	.	0	15	0			
Lieut.-Col. W. E. Marshall, .	.	11	0	0			
J. G. Delmerick, Esq., .	.	7	4	0			
				1,621	4	2	998

Carried over, Rs. 20,584 9 0



DISBURSEMENTS.				1874.	1873.
Brought over, Rs.				2,816 7 4	10,172 14 5
ion to the Army List,	.	16	0 0		
Mali,	.	52	4 0		
ion to the Directory,	.	14	0 0		
charges,	.	49	0 0		
f Postal Guide,	.	1	0 0		
Paper Files,	.	5	0 0		
lgers,	.	47	6 0		
.	.	2	8 0		
o Islam Khan,	.	36	0 0		
ng charges,	.	23	4 0		
nd Blank Book,	.	6	12 0		
Paper,	.	12	0 0		
rges,	.	37	15 6		
				3,119 8 10	2,614 0 4
END.					
per cent. Government Security,	1,500	0 0			
1 ditto,	.	22	0 0		
on ditto,	.	118	2 0		
on ditto,	.	4	1 7		
newing Government Security,	.	1	0 0		
on on collecting Interest on the					
Securities,	.	1	1 10		
				1,646 5 5	5,975 9 11
.	.	384	0 0		
1 Lighting rate,	.	216	0 0		
te,	.	235	3 1		
charges,	.	84	10 9		
				919 13 10	3,539 2 6
.					
old Coin of Mahamud Shah,	.	50	0 0		
Drodatus,	.	50	0 0		
Husan Shah,	.	26	0 0		
e Coin Cabinet,	.	139	0 0		
tting Money Order,	.	0	8 0		
g for Coin,	.	0	8 0		
				266 0 0	
ZKA MEMORIAL FUND.					
Photographer,	.	37	0 0		
to the Bank of Bengal for	.				
Nursing Rao's Draft,	.	1	0 0		
Long Cloth for covering Picture,	.	0	12 0		
na returned letter of Capt. A. G.	.	0	0 6		
				38 12 6	
EOTS.					
.	.	360	11 1		
ishee,	.	370	5 0		
sack,	.	154	6 6		
re,	.	156	14 6		
.	.	0	12 0		
sq.,	.	3	4 0		
.	.	5	15 0		
ghes,	.	1	8 0		
.	.	0	7 9		
				1,054 3 10	
Carried over, Rs.				16,163 7 0	



RECEIPTS.

	Brought over, Rs.	20,584	9	0
BALANCE OF 1873.				
In the Bank of Bengal, .	.	3,392	14	6
Cash in hand, .	.	393	15	10
		<u>3,786</u>	14	4

Rs. 24,371 7 4

Examined and found correct,  
 E. GAY,  
 F. W. PETERSON,  
*Auditors.*

13th Feb., 1875.



DISBURSEMENTS.

1874.

1873.

Brought over, Rs.	1,054	3	10	16,163	7	0
. H. Johnstone,	.	12	8	0		
nel, Esq.,	.	3	6	0		
wn,	.	0	6	9		
betson,	.	7	6	0		
N. W. Provinces,	.	15	3	0		
Fryer,	.	1	6	0		
ory,	.	40	0	0		
zka,	.	7	5	6		
son, Esq.,	.	2	0	0		
foernle,	.	1	7	0		
rick, Esq.,	.	2	0	0		
a, Esq.,	.	2	9	0		
b, Esq.,	.	0	3	0		
, Esq.,	.	1	4	0		
lie,	.	3	6	0		
son, Esq.,	.	0	8	0		
f, Esq.,	.	4	6	0		
lbert, Esq.,	.	3	5	0		
. W. Stubb,	.	8	5	3		
ms, Esq.,	.	0	4	0		
oster,	.	2	10	0		
N. E. Marshall,	.	4	1	0		
macott, Esq.,	.	2	2	0		
ter, Esq.,	.	0	4	0		
iprasad Singh,	.	0	4	0		
en Dass Bahadur,	.	0	4	0		
, Esq.,	.	0	1	0		
. Holcombe,	.	2	4	0		
roy, Esq.,	.	3	9	0		
nstable, Esq.,	.	2	5	0		
. C. Hamilton,	.	0	8	9		
				1,189	11	1
				1,966	13	1
				17,353	2	1

3.  
of Bengal, viz.  
Stoliczka Memorial

.	1,201	3	6			
Asiatic Society of	5,655	8	8			
				6,856	12	2
				161	9	1
				7,018	5	3
				Rs. 24,371	7	4

Examined and found correct,

E. GAY,  
F. W. PETERSON,  
*Auditors.*

h., 1875.



# STATEMENT

## *Abstract of the Cash Account*

RECEIPTS.		1874.	1873
ORIENTAL PUBLICATIONS.			
Received by Sale of Bibliotheca Indica, Rs.	2,069 7 9		
Ditto by Subscription to ditto, .	144 12 0		
Ditto Refund of Postage, .	53 4 9		
Ditto Refund of Freight, .	3 9 0		
		2,271 1 6	2,970
GOVERNMENT ALLOWANCE.			
Received from the General Treasury at 500 Rs. per month, .	6,000 0 0		
Ditto ditto additional grant for the publication of Sanskrit Works, at 250 per month, .	3,000 0 0		
		9,000 0 0	9,000
TABAQATI NISIRI.			
Refund of the half amount from Yusuf Ali Munshce on account of Landing charges, .	3 3 0		
		3 3 0	
Asiatic Society of Bengal, .	360 11 1		
Archbold Constable, .	1 0 0		
Babu Braj Bhushan Das, .	7 1 3		
Babu Profullo Chunder Banerjee, .	1 9 0		
Babu Kedar Nath Banerjee, .	20 11 0		
Babu Buddinath Chowdhury, .	3 0 0		
Babu Gopal Row Hurry, .	0 8 0		
		394 8 4	975
CONSERVATION OF SANSKRIT MSS.			
Received from the Government of Bengal, in part of the amount sanctioned towards the Conservation of Sanskrit MSS. being 1st half of 1873-74, .	1,550 0 0		
Ditto ditto being 2nd half of 1873-74, .	1,550 0 0		
Ditto ditto being 1st half of 1874-75, .	1,600 0 0		
Sale proceeds of 11 Copies Notices of Sanskrit MSS., .	11 0 0		
		4,711 0 0	2,002

Carried over, Rs. 16,379 12 10



## No. 2.

*Oriental Publication Fund, 1874.*

DISBURSEMENTS.		1874.	1873.
ORIENTAL PUBLICATIONS.			
Paid Commission on Sale of Books, &c., Rs.	180 12 0		
Ditto Packing charges, . . . . .	27 2 0		
Ditto Postage Stamps, . . . . .	117 14 10		
Ditto Freight, . . . . .	136 15 0		
Ditto Advertising charges, . . . . .	200 0 0		
Ditto Insufficient Postage, . . . . .	0 1 0		
Ditto Copying charges, . . . . .	2 6 0		
Ditto Custom duty and landing charges, . . . . .	10 0 0		
Ditto Banghee expenses, . . . . .	0 4 0		
Ditto Printing charges, . . . . .	8 0 0		
Ditto Petty charges, . . . . .	3 12 3		
		687 3 1	1,132 10 9
LIBRARY.			
Paid Purchase of Persian Printed Books, . . . . .	494 11 0		
		494 11 0	777 6 0
CUSTODY OF ORIENTAL WORKS.			
Paid Salary of the Librarian, . . . . .	360 0 0		
Ditto Establishment, . . . . .	724 0 0		
Ditto Stationery, . . . . .	30 0 0		
Ditto Fee for Stamping Cheques, . . . . .	2 13 0		
Ditto Book Binding, . . . . .	99 0 0		
Ditto Bearing Postage, . . . . .	0 2 0		
Ditto Repairing Almirah, Table, &c., . . . . .	6 8 0		
Ditto Purchase of Ledger, . . . . .	3 0 0		
Ditto Printing charges, . . . . .	8 7 0		
Ditto Banghee expenses, . . . . .	4 11 6		
Ditto Packing charges, . . . . .	3 14 3		
Ditto 6 bottles of Carbolic Acid, . . . . .	12 0 0		
Ditto Petty charges, . . . . .	18 14 0		
		1,273 5 9	1,220 9 9
CATALOGUE OF SANSKRIT MSS.			
Paid Salary for Cataloguing Sanskrit MSS., . . . . .	358 0 0		
		358 0 0	360 0 0
COPYING CHARGES.			
Paid Copying MSS., . . . . .	19 4 0		
		19 4 0	20 4 0
AIN I AKBARI.			
Paid Printing charges, . . . . .	949 8 0		
Ditto Binding of Ain i Akbari, . . . . .	59 12 0		
Ditto Banghee expenses, . . . . .	2 8 0		
		1,011 12 0	699 0 0
SAMA VEDA.			
Paid Editing and Printing charges, . . . . .	608 7 0		
		608 7 0	1,205 6 6
AGNIPURANA.			
Paid Editing and Printing charges, . . . . .	973 8 6		
Ditto Banghee expenses, . . . . .	3 2 0		
		976 10 6	
CHATURVARGA CHINTAMANI.			
Paid Editing and Printing charges, . . . . .	344 11 0		
		344 11 0	1,312 12 0
Carried over, Rs.		5,774 0 4	



xxii

RECEIPTS.	1874.	1875.
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Brought over, Rs. 16,379 12 10

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Carried over, Rs. 16,379 12 10



DISBURSEMENTS.		1874.	1873.
Brought over, Rs. 5,774 0 4			
MIMANSA DARŚANA.			
Paid Editing and Printing charges,	. 147 6 0	147 6 0	
LATYANA SUTRA.			
Paid Printing charges, . . .	. 56 5 9	56 5 9	
KHAṢI KHAN.			
Paid Printing charges, . . .	. 539 0 0		
Ditto Copying charges, . . .	. 62 10 0		
Ditto for making Index, . . .	. 220 0 0	821 10 0	
PRITHIRAJ RASU.			
Paid Editing and Printing charges, .	. 376 0 0		
Ditto Fee for getting money order, .	. 1 8 0		
Ditto Freight, . . .	. 2 9 6		
Ditto Banghee expenses, . . .	. 1 6 0	381 7 6	236 0 0
ISABAH OR BIOGRAPHICAL DICTIONARY.			
Paid Printing charges, . . .	. 81 0 0	81 0 0	
FARHANGI RASHIDI.			
Paid Editing and Printing charges, .	. 779 0 0	779 0 0	1,182 8 0
ŚRAUTA SUTRA ASWALAYANA.			
Paid Editing and Printing charges,	. 250 10 0	250 10 0	435 0 0
KATANTARA.			
Paid Editing and Printing charges,	. 1,440 9 0	1,440 9 0	
TANDYA MAHA BRAHMANA.			
Paid Editing and Printing charges,	. 428 10 9	428 10 9	
TĀITTIRIYA SANHITA OF THE BLACK YAJURVEDA.			
Paid Editing and Printing charges,	. 326 6 0	326 6 0	342 0 0
ATHAVANA UPANISHAD.			
Paid Editing and Printing charges,	. 304 15 6	304 15 6	988 15 0
SAHITYA DARPAṆA.			
Paid Postage, . . .	. 1 4 0	1 4 0	0 6 0
ĀLAMGIRI NAMAḤ.			
Paid Printing charges, . . .	. 241 2 0	241 2 0	
MAĀSIR ĀLAMGIRI.			
Paid Printing charges, . . .	. 371 12 0	371 12 0	25 0 0
HAṬṬ ASMAN.			
Paid Printing charges, . . .	. 128 4 0	128 4 0	
PIṆGALA CHHANDA SUTRA.			
Paid Editing charges, . . .	. 149 0 0	149 0 0	
Carried over, Rs. 11,683 6 10			



## RECEIPTS.

1874.

187

Brought over, Rs. 16,379 12 10

## BALANCE OF 1873.

In the Bank of Bengal, viz.  
Conservation of Sanskrit MSS.

Dr. J. Muir,	.	.	.	.	3,733 12 11
O. P. Fund,	.	.	.	.	898 10 0
					1,267 15 5
					<u>5,923 12 2</u>

Rs. 22,303 9 0

Examined and found correct,

E. GAY,

F. W. PETERSON,

*Auditors.*

13th Feb., 1875.



## DISBURSEMENTS.

1874.

1873.

Brought over, Rs. 11,683 6 10

## JAYA GRIHYA SUTRA.

ing charges, . . .	224	0	0			
ety of Bengal, . . .	641	1	5	224	0	0
umby, Esq. . . . .	0	0	10			562 12 0
Hurry, . . . . .	0	0	10			
Esq. . . . .	3	14	0			
Bhushan Das, . . . .	9	12	3			
e Churn Bhadoori, . .	2	10	0			
riprasad Sing, . . . .	3	12	0			
hone Lal, . . . . .	4	14	0			
				666	1	4

## IVATION OF SANSKRIT MSS.

for preparing Catalogue of Sans-	360	0	0			
for translating the Sanskrit Cata-	240	0	0			
r for Travelling Pandita, . .	345	1	6			
ng MSS., . . . . .	187	2	6			
ationery, . . . . .	50	10	0			
inghee expenses, . . . .	5	4	0			
ing charges of Notices of Sanskrit	912	0	0			
ng charges, . . . . .	22	2	0			
ngent charges for Travelling Pandita,	9	7	6			
ge for sending Notices of Sanskrit	12	6	0			
ht for ditto ditto, . . . .	46	0	0			
m Duty and Landing charges, .	16	0	0			
Rajendra Lala Mitra, as an ad-						
travelling allowance and for pur-						
sanskrit MSS., . . . . .	1,200	0	0			
ing Paper, . . . . .	22	0	0			
urchase of Sanskrit MSS., . .	35	0	0			
eparating Stones for Sanskrit Notices						
l Printing 510 Copies for ditto, .	104	0	0			
hara Cloth and Tape for binding						
MSS., . . . . .	19	5	6			
charges, . . . . .	25	13	3			
				3,612	4	3
				2,244	11	6

CE.

k of Bengal, viz. :

n of Sanskrit MSS., . .	4,832	8	8			
, . . . . .	898	10	0			
, . . . . .	261	6	0			
				5,992	8	8
id, . . . . .				125	3	11

6,117 12 7

Rs. 22,303 9 0

Examined and found correct,

E. GAY,

F. W. PETERSON,

Auditors.

eb., 1875.



# STATEMENT No. 3.

## Shewing the Assets and Liabilities of the Asiatic Society of Bengal on the 1st July, 1875.

ASSETS.		1874.	1873.	LIABILITIES.		1874.
CASH.				Salary and Establishment for Decem-		
In the Bank of Bengal,	.....	6,856 12 2	3,392 14 6	ber, 1874, .....		
Cash in hand, .....		161 9 1	333 15 10	PUBLICATION.		324 10 8
Government Securities, .....		9,200 0 0	7,700 0 0	Proceedings No. IX. of		
		16,218 5 3	11,486 14 4	1874, .....		250 4 0
OUTSTANDING.				Journal, Part I. No. III. ...		545 0 0
Admission fees, .....	34 0 0	384 0 0		Ditto Part II. No. III. ...		232 8 0
Subscriptions, .....	7,009 5 0	6,733 7 0		Tinted Plate Paper, .....		10 6 6
Sale of Journal, .....	812 7 3	413 13 6		Probable Cost of Proceed-		
Subscription of do. ....	634 15 9	688 12 9		ing No. X. ....		300 0 0
Sale of Library Books, .....	236 11 0	520 1 0		Do. Journal, Part I. No. 4, 500 0 0		
				Do. " Part II. No. 4, 400 0 0		2,238 2 6
Due by the O. P. Fund, .....	8,727 7 0	8,740 2 3		Dr. Stoliczka Memorial Fund, .....		1,201 3 6
Do. Bank of Bengal Fund account, ..	360 11 1	641 1 5		Collector of Assessment, House rate for		
	111 12 5	332 0 0		October, Nov. and Dec., 1874, ....		96 0 0
	9,199 14 6	9,713 3 8		Police and Lighting rate, .....		54 0 0
				The Great Eastern Hotel, for Tea and		
				Coffee, .....		8 4 0
				F. and C. Osler, & Co. for 2 Osler's		
				patent Double Light-plated Reading		
				Lamp, .....		112 0 0
Total Rs. ....		25,418 3 9		Total Rs. ....		4,034 4 8

We have examined this Statement and find it correct.



*Shewing the Assets and Liabilities of the Asiatic Society of Bengal, O. P. F.,  
on the 1st January, 1875.*

We have examined this Statement, and see no reason to doubt its correctness.

E. CAY.  
F. W. P.



NOV 19 1920

STATEMENT No. 5.

*Conservation of Sanskrit MSS. in Account Current with the Asiatic Society of Bengal.*

Cr.	1874 0 0	Dr.	1874 0 0
Balance of 1873, .....	3,733 12 11	Amount Spent in 1874, .....	3,612 4 3
Received from the Government of Bengal for Conservation and Publication of Sanskrit MSS. up to First Half of 1874, i. e. June, 1874, .....	4,700 0 0	Balance, .....	4,832 8 8
Sale proceeds of 11 Copies Notices of Sanskrit MSS, .....	11 0 0		8,444 12 11
	8,444 12 11		
Ra.....	8,444 12 11	Ra.....	8,444 12 11

Examined and found correct.

E. GAY,  
F. W. PETERSON,  
*Auditors.*

*The 13th February, 1875.*



**STATEMENT No. 4.**  
*Shewing the Assets and Liabilities of the Asiatic Society of Bengal, O. P. F.,  
on the 1st January, 1875.*

ASSETS.	1874.			1873.		
In the Bank of Bengal, viz., .....						
Conservation of Sanskrit MSS. ....	4,832	8	8			
Dr. J. Muir, .....	898	10	0			
O. P. Fund, .....	261	6	0	5,992	8	8
				5,992	8	8
Cash in hands, .....				125	3	11
Government Allowance for Dec., 1874, ..				750	0	0
Bibliotheca Sale and Subscription, ....				2,067	11	2
Col. Dalton, Ethnology of Bengal, ....				42	13	8
				42	13	8
				23	5	10
				750	0	0
				1,820	14	0
				42	13	8
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